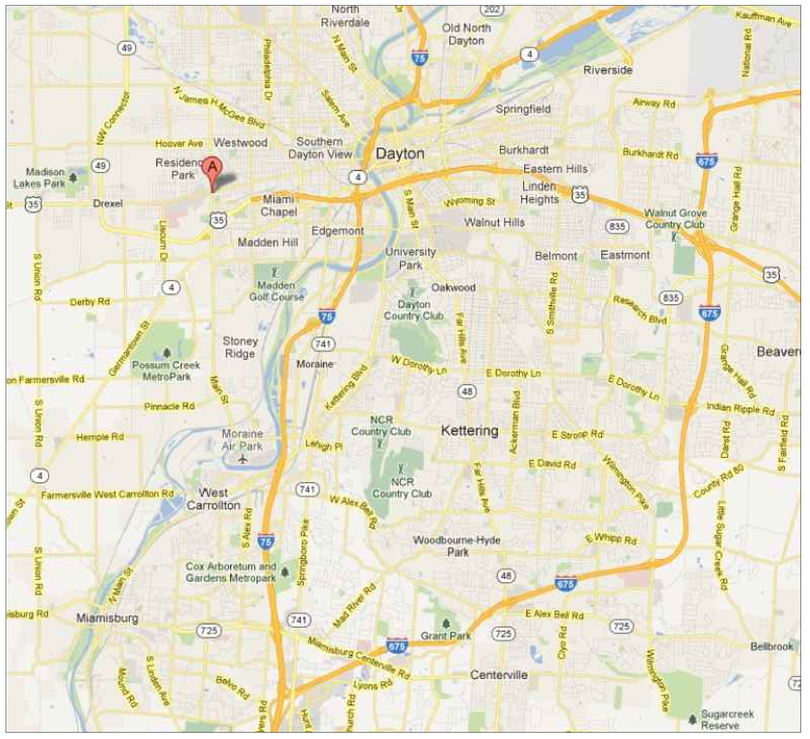
IMPROVE BUILDING AUTOMATION SYSTEM

DEPARTMENT OF VETERANS AFFAIRS MEDICAL CENTER
4100 WEST THIRD STREET
DAYTON, OHIO 45428



VA Project No: 552-15-207
Heapy Project No: 2013-04011
Firm License: 01528

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Revisions | Date

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PROJECT NO. 2013-04011 FIRM LICENSE NO. 01528

Drawing Title: COVER SHEET
Approved: Chief, Engineering Service

Project Title: DVAMC IMPROVE BUILDING AUTOMATION SYSTEM
Building Number: ## | Checked: PCW | Drawn: JAC
Location: Dayton, Ohio

Date: 05/23/2014
Project No.: VA Project No. 552-15-207
Drawing Number: C001
Dwg. of

Planning & Design
Department of Veterans Affairs

PROJECT NO. 2013-04011
HEAPY ENGINEERING
DAYTON/COLUMBUS, OHIO & INDIANAPOLIS, INDIANA
MECHANICAL ELECTRICAL COMMISSIONING TECHNOLOGY
PLOTTED BY: JAC
PLOT DATE: May 23, 2014

DRAWING SYMBOLS

Symbol	Description
2 / H4	DETAIL NUMBER
	DRAWING NUMBER WHERE DRAWN
A / H7	SECTION LETTER
	DRAWING NUMBER WHERE DRAWN
1-SF3	BUILDING NO. WHERE EQUIPMENT IS LOCATED.
	EQUIPMENT ABBREVIATION (SUPPLY FAN)
	SUPPLY FAN NO.3 IN BUILDING NO.1
	TYPICAL UNIT NO.
1-01	TERMINAL UNIT DESIGNATION

CONTROLS

Symbol	Description
T H	ROOM CONTROL: THERMOSTAT, HUMIDISTAT
T	REMOTE BULB THERMOSTAT
T	DUCT OR PIPE THERMOSTAT (NOTE 1: PROVIDE 12" MIN. LENGTH IN DUCT WHEN SPACE PERMITS)
T	DUCT THERMOSTAT WITH AVERAGING ELEMENT
T H	ROOM SENSOR: TEMPERATURE, HUMIDITY
T	DUCT OR PIPE TEMP. SENSOR (SEE NOTE 1 ABOVE)
H	DUCT HUMIDITY SENSOR
SP	DUCT STATIC PRESSURE SENSOR
T	DUCT TEMPERATURE SENSOR WITH AVERAGING ELEMENT
F S	SMOKE DETECTOR (SEE ELECTRICAL SPECIFICATIONS)
H1 N	CONTROL CIRCUIT CONN.
dP	DIFFERENTIAL PRESSURE SWITCH
DP SP	DIFFERENTIAL OR STATIC PRESSURE TRANSMITTER
CS	CURRENT SENSING RELAY
C	CARBON DIOXIDE SENSOR FOR SYSTEM ALARM

PIPING SYMBOLS

HEATING

Symbol	Description
HPS (125)	HIGH PRESSURE STEAM (60 PSIG AND ABOVE) NUMBER INDICATES STEAM PRESSURE
HPR	HIGH PRESSURE STEAM CONDENSATE RETURN
MPS (30)	MEDIUM PRESSURE STEAM (16 PSIG THRU 59 PSIG) NUMBER INDICATES STEAM PRESSURE
MPR	MEDIUM PRESSURE STEAM CONDENSATE RETURN
LPS (5)	LOW PRESSURE STEAM (15 PSIG & BELOW) NUMBER INDICATES STEAM PRESSURE
LPR	LOW PRESSURE STEAM CONDENSATE RETURN
HWS	HEATING HOT WATER SUPPLY
HWR	HEATING HOT WATER RETURN
V	VENT LINE
PC	PUMPED CONDENSATE RETURN
MU	DOMESTIC WATER MAKEUP

AIR CONDITIONING

Symbol	Description
CHS	CHILLED WATER SUPPLY
CHR	CHILLED WATER RETURN
D	DRAIN LINE
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
ET	EXPANSION TANK INLET

GENERAL

- DIRECTION OF PIPE PITCH (DOWN)
- DIRECTION OF FLOW
- REDUCER OR INCREASER
- ECCENTRIC REDUCER
- TOP CONNECTION, 45 DEG. OR 90 DEG.
- BOTTOM CONNECTION, 45 DEG. OR 90 DEG.
- SIDE CONNECTION
- CAPPED OUTLET
- RISE OR DROP IN PIPE
- UNION
- PIPE UP
- PIPE DOWN
- POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK.
- INVERTED BUCKET TRAP SET INCLUDING PIPING ACCESSORIES (SEE STANDARD DETAIL)
- FLOAT AND THERMOSTATIC TRAP SET INCLUDING PIPING ACCESSORIES (SEE STANDARD DETAIL)
- THERMOSTATIC TRAP
- STRAINER
- THERMOMETER
- PRESSURE GAGE
- EXISTING PIPE TO BE REMOVED
- TEST PLUG (PRESSURE/TEMPERATURE)

VALVES

- GATE VALVE
- GLOBE VALVE
- GATE VALVE WITH 3/4" HOSE END ADAPTER
- CHECK VALVE
- BUTTERFLY VALVE
- BALL VALVE
- COMBINATION BALANCING/SHUT-OFF VALVE
- CIRCUIT SETTER
- STRAIGHT-THRU MODULATING CONTROL VALVE
- STRAIGHT-THRU TWO-POSITION CONTROL VALVE
- THREE-WAY MODULATING CONTROL VALVE
- AUTOMATIC FLOW CONTROL VALVE
- SAFETY VALVE OR PRESSURE RELIEF
- PRESSURE REDUCING VALVE
- MANUAL AIR VENT

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AFMD	AIR FLOW MEASURING DEVICE
AHU	AIR HANDLING UNIT
AI	ANALOG INPUT
AO	ANALOG OUTPUT
APD	AIR PRESSURE DROP
ATC	AUTOMATIC TEMPERATURE CONTROLS
BHP	BRAKE HORSEPOWER
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
C	CONVERTOR
CC	COOLING COIL
CFM	CUBIC FEET PER MINUTE
CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
CONV	CONVECTOR
CR	CEILING REGISTER
CU	CONDENSING UNIT
CW	COLD WATER (POTABLE)
D	AUTOMATIC CONTROL DAMPER
Db	DRY BULB TEMPERATURE, DEG. F
dBA	DECIBELS
DDC	DIRECT DIGITAL CONTROLS
DEG	DEGREE
DI	DIGITAL INPUT
DIA	DIAMETER
DO	DIGITAL OUTPUT
DP	DIFFERENTIAL PRESSURE SENSOR
ECC	ENGINEERING CONTROL CENTER
EF	EXHAUST FAN
ENT	ENTERING
EX.	EXISTING
F	FAHRENHEIT
F&T	FLOAT AND THERMOSTATIC
FLR.	FLOOR
FPM	FEET PER MINUTE
FT	FEET
FTR	FIN TUBE RADIATION
GPM	GALLONS PER MINUTE
HC	HEATING COIL
HD	HEAD
HP	HORSEPOWER
HPR	HIGH PRESSURE STEAM CONDENSATE RETURN

ABBREVIATIONS

HPS	HIGH PRESSURE STEAM SUPPLY (60 PSIG & ABOVE)
HWR	HEATING HOT WATER RETURN
HWS	HEATING HOT WATER SUPPLY
IFB	INTEGRAL FACE & BYPASS
HWR	HEATING HOT WATER RETURN
HWS	HEATING HOT WATER SUPPLY
IFB	INTEGRAL FACE & BYPASS
IN	INCHES
IN WC	INCHES WATER COLUMN
IN WG	INCHES WATER GAUGE
LAT	LEAVING AIR TEMPERATURE
LBS/HR	POUNDS PER HOUR
LPR	LOW PRESSURE STEAM CONDENSATE RETURN
LPS	LOW PRESSURE STEAM SUPPLY (15 PSIG & BELOW)
LTCP	LOCAL TEMPERATURE CONTROL PANEL
LVG	LEAVING
MAX	MAXIMUM
MBH	1000 BTUH
MIN	MINIMUM
MPR	MEDIUM PRESSURE STEAM CONDENSATE RETURN
MPS	MEDIUM PRESSURE STEAM SUPPLY (16 PSIG THRU 59 PSIG)
NC	NOISE CRITERIA
NOM	NOMINAL
O.A.	OUTSIDE AIR
PD	PRESSURE DROP (FEET OF WATER)
PF	PRE-FILTER
PH	PREHEAT COIL
POD	POWER OPERATED, OPPOSED BLADE DAMPER
PPD	POWER OPERATED, PARALLEL BLADE DAMPER
Rh	RELATIVE HUMIDITY
RPM	REVOLUTIONS PER MINUTE
SDR	SMOKE DAMPER (RETURN)
SDS	SMOKE DAMPER (SUPPLY)
SF	SUPPLY FAN
SH	STEAM HUMIDIFIER
S.P.	STATIC PRESSURE (INCHES OF WATER)
SPS	STATIC PRESSURE SENSOR
UH	UNIT HEATER
V	VALVE
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
Wb	WET BULB TEMPERATURE, DEG. F

GENERAL NOTES:

1. THESE NOTES APPLY EQUALLY TO THE FULL SET OF DOCUMENTS.
2. INSULATE DUCTWORK AND PIPING WHERE EXISTING INSULATION HAS BEEN DAMAGED AND/OR REMOVED IN THE PERFORMANCE OF WORK IN THIS PROJECT.
3. THE CONTRACTORS SHALL REFER TO ALL SPECIFICATION SECTIONS AND THESE DRAWINGS FOR DETAILS OF BUILDING CONSTRUCTION TO ENSURE SPACE AND SATISFACTORY ARRANGEMENT FOR THEIR WORK. THE VARIOUS DRAWINGS COMPRISING THE SET ARE INTERDEPENDENT AND MUST BE USED JOINTLY AT ALL TIMES. EACH CONTRACTOR SHALL REFER TO THE GENERAL REQUIREMENTS OF THE CONTRACT. THE NOTES AND SYMBOLS INDICATED ON THE DRAWINGS ARE FOR THE GUIDANCE OF ALL TRADES INVOLVED IN THE PROJECT AND MUST BE FOLLOWED TO EXECUTE THE WORK AS INTENDED. IF DISCREPANCIES OCCUR, CONTACT THE VA COR THRU THE CONTRACTING OFFICER FOR CLARIFICATION BEFORE PROCEEDING.
4. EACH CONTRACTOR SHALL COORDINATE HIS WORK WITH THE WORK OF OTHERS. HE SHALL KEEP HIMSELF INFORMED OF THE PROGRESS AND DETAIL DEVELOPMENT OF THE WORK OF OTHERS AND SHALL BE RESPONSIBLE FOR COORDINATING AND EXPEDITING HIS WORK WITH OTHERS SO THAT THE PROGRESS OF THE TOTAL WORK SHALL BE KEPT ON SCHEDULE.
5. ALL WORK SHALL BE PERFORMED IN COMPLETE COMPLIANCE WITH ALL GOVERNING CODES AND STANDARDS.
6. EXISTING CONDITIONS SHOWN MAY BE AT VARIANCE WITH ACTUAL WORK IN PLACE. THE CONTRACTOR SHALL TAKE ALL NECESSARY FIELD MEASUREMENTS AND FIELD VERIFY ALL CONDITIONS AFFECTING THE EXECUTION OF THE WORK. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND THE WORK SHOWN ON THE CONTRACT DOCUMENTS WHICH MAY IMPACT THE PROGRESS OF THE WORK SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTING OFFICER IN WRITING FOR RESOLUTION BEFORE PROCEEDING WITH THE WORK.
7. EACH CONTRACTOR AND/OR TRADE, FITTING OR PLACING HIS WORK INTO OR ON THE WORK OF OTHERS DOES SO WITH THE UNDERSTANDING THAT THE INSTALLATION OF HIS WORK CONSTITUTES HIS ACCEPTANCE OF THE SUITABILITY OF THE WORK IN PLACE. IF THE WORK OF OTHERS IS NOT ACCEPTABLE, HE SHALL NOTIFY THE VA COR AND SUCH WORK SHALL BE CORRECTED. ANY NEW WORK INSTALLED IN UNSUITABLE EXISTING WORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR OR TRADE INSTALLING THE NEW WORK. NO CLAIMS FOR ADDITIONAL COMPENSATION FOR CORRECTING WORK INSTALLED IN UNSUITABLE EXISTING CONDITIONS WILL BE CONSIDERED.
8. ALL PENETRATIONS THROUGH EXISTING FIRE-RATED ASSEMBLIES SHALL BE PROTECTED AND/OR FIRE-STOPPED AS REQUIRED TO MAINTAIN FIRE-RATINGS INDICATED. COORDINATE WITH ALL TRADES TO ENSURE FIRE-RATED PENETRATION REQUIREMENTS AND DETAILS ARE MET.
9. ANNULAR SPACE OF ALL PIPE, CONDUIT, & OTHER SIMILAR PENETRATIONS OF FIRE RATED ASSEMBLIES SHALL BE FIRESTOPPED. IN ADDITION, PENETRATIONS THROUGH 0-HOUR RATED WALLS & FLOORS SHALL BE FIRESTOPPED TO RETARD PASSAGE OF FIRE & SMOKE.
10. ACCESS PANELS IN NON ACCESSIBLE SUSPENDED CEILINGS SHALL BE PROVIDED FOR ALL VALVES, TRAPS, DAMPERS, CLEANOUTS, FLOW METERS, CONTROLS, ETC.
11. WHERE DUCTS OR PIPES ARE REMOVED THRU WALL/FLOOR/ROOF THAT IS TO REMAIN, PATCH WALL/FLOOR/ROOF OPENING TO MATCH EXISTING WHERE OPENING IS NOT RE-USED.
12. ALL CUTTING AND PATCHING REQUIRED FOR THIS PROJECT SHALL BE INCLUDED IN THE CONTRACT. REFINISH ANY SURFACE DISTURBED UNDER THIS WORK TO MATCH EXISTING.
13. ANY REMOVED EQUIPMENT SHALL BE TURNED OVER TO THE VA. ITEMS NOT DESIRED BY THE VA SHALL BE REMOVED FROM THE PREMISES AND DISPOSED OF PROPERLY BY THE CONTRACTOR.
14. THE CONTRACT DRAWINGS ARE NOT INTENDED TO SHOW EVERY VERTICAL OR HORIZONTAL OFFSET WHICH MAY BE NECESSARY TO COMPLETE THE SYSTEMS. COORDINATE WORK IN ADVANCE WITH ALL OTHER TRADES AND REPORT IMMEDIATELY ANY DIFFICULTIES WHICH CAN BE ANTICIPATED.
15. WHERE CONTROL DEVICES ARE REMOVED, PNEUMATIC LINES SHALL BE REMOVED BACK TO POINT OF ACTIVE MAIN AND CAPPED; AND CONTROL WIRING AND CONDUIT SHALL BE REMOVED BACK TO SOURCE.
16. ALL EXISTING PIPING, EQUIPMENT, CONTROLS, ETC. SHOWN DASHED SHALL BE REMOVED. THE MAJORITY OF WORK TO BE REMOVED IS SHOWN. REMOVE ALL INCIDENTAL AND/OR ABANDONED EQUIPMENT, DUCTWORK, PIPING, ETC. THAT MAY NOT BE SHOWN BUT IS ASSOCIATED WITH THE REMOVAL WORK.
17. WHERE EXISTING HVAC UTILITIES IN SERVICE WILL BE DISRUPTED DURING THE CONSTRUCTION OF THIS PROJECT, THIS WORK SHALL BE PERFORMED ON WEEKENDS OR WEEK NIGHTS, IF REQUIRED BY THE VA COR. DOWNTIME SHALL BE KEPT TO A MINIMUM, AND SHALL BE COORDINATED AND SCHEDULED WELL IN ADVANCE (MINIMUM 15 WORKING DAYS) WITH THE VA COR.

Revisions		Date

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Drawing Title	LEGEND, ABBREVIATIONS, AND GENERAL NOTES
Approved: Chief, Engineering Service	
Project Title	DVAMC IMPROVE BUILDING AUTOMATION SYSTEM
Building Number	##
Checked	PCW
Drawn	JAC
Location	Dayton, Ohio
Date	05/23/2014
Project No.	VA Project No. 552-15-207
Drawing Number	M001
Dwg. of	

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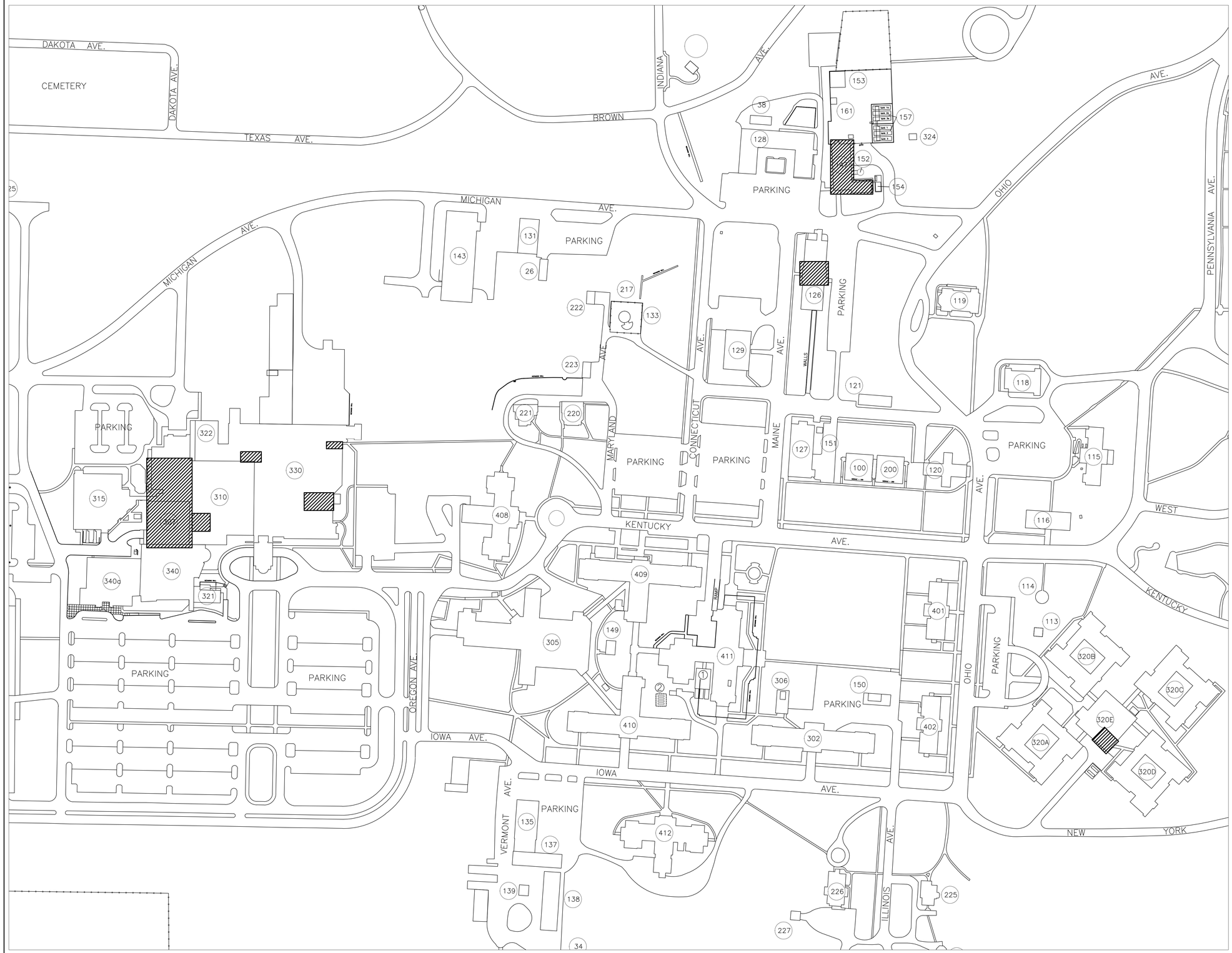
MECHANICAL ELECTRICAL COMMISSIONING TECHNOLOGY
PLOTTED BY: jacoyle
PLOT/EDIT DATE: May 22, 2014



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PROJECT NO. 2013-04011 FIRM LICENSE NO. 01528

Drawing Title: SITE PLAN
Approved: Chief, Engineering Service

Project Title: DVAMC IMPROVE BUILDING AUTOMATION SYSTEM
Building Number: ##
Checked: PCW
Drawn: JAC
Location: Dayton, Ohio

Date: 05/23/2014
Project No.: VA Project No. 552-15-207
Drawing Number: MS
Dwg. of

Planning & Design
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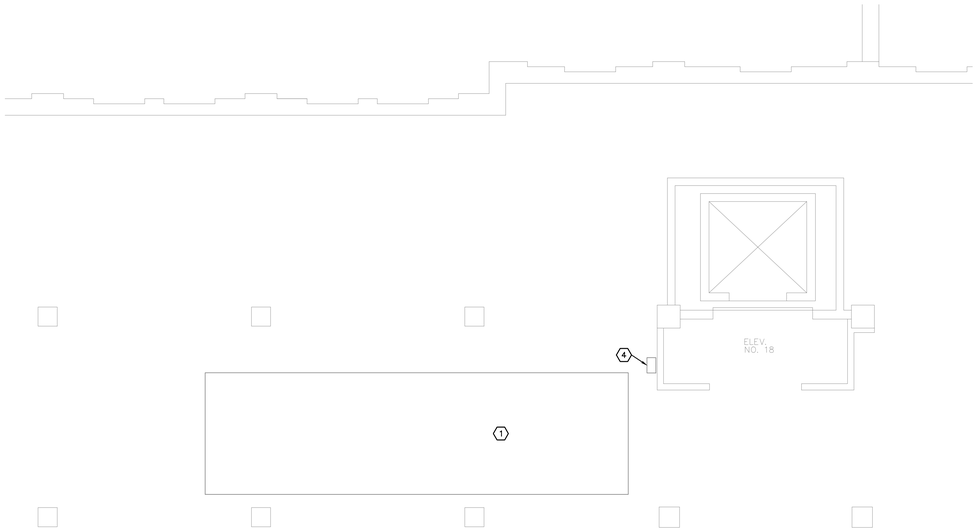
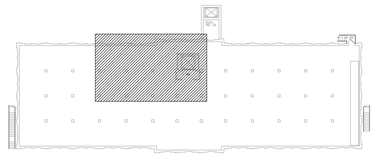
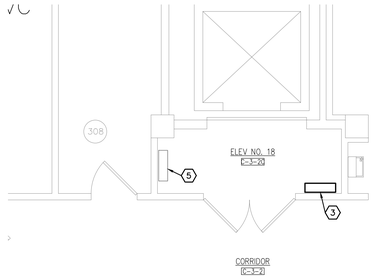
PROJECT NO. 2013-04011
HEAPY ENGINEERING
DAYTON/COLUMBUS, OHIO, & INDIANAPOLIS, INDIANA
MECHANICAL ELECTRICAL COMMISSIONING TECHNOLOGY
PLOTTED BY: Jpope
PLOTTED DATE: May 22, 2014



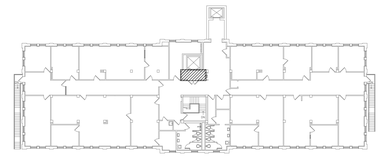
PARTIAL ATTIC FLOOR PLAN
SCALE: 1/4" = 1'-0"



KEYPLAN - ATTIC



PARTIAL THIRD FLOOR PLAN
SCALE: 1/4" = 1'-0"



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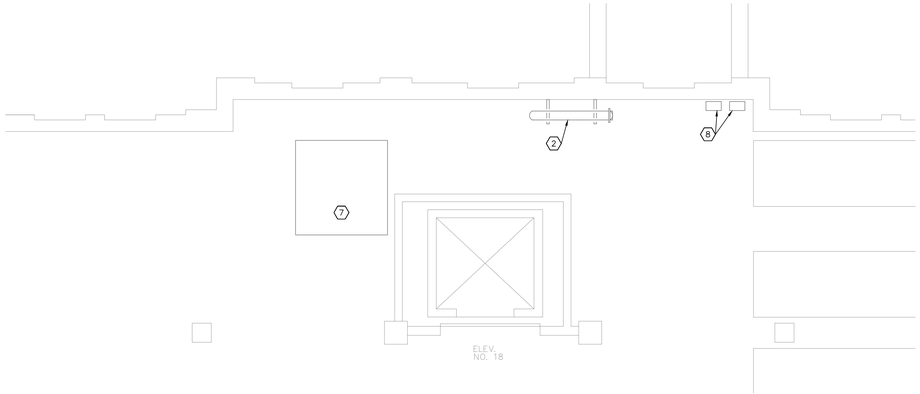

PARTIAL SECOND FLOOR PLAN
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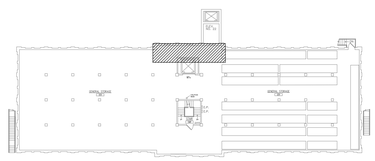

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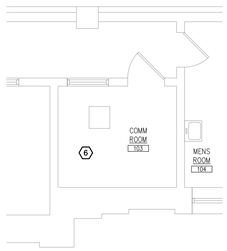
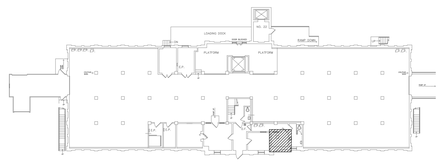


PARTIAL FIRST FLOOR PLAN
SCALE: 1/4" = 1'-0"



KEYPLAN - 1ST FLOOR

GENERAL NOTES

A REFER TO SHEET M001 FOR LEGEND, ABBREVIATIONS, AND ADDITIONAL GENERAL NOTES.

NOTES

1 EXISTING AIR HANDLING UNIT TO REMAIN. REFER TO SHEET MC126 FOR CONTROLS SCOPE ASSOCIATED WITH THIS SYSTEM.

2 EXISTING SHELL & TUBE STEAM TO HEATING HOT WATER CONVERTER TO REMAIN. REFER TO SHEET MC126 FOR CONTROLS SCOPE ASSOCIATED WITH THIS SYSTEM.

3 EXISTING ANDOVER PANEL CONTROLS ATTIC AHU AND 2ND FLOOR HEATING HOT WATER SYSTEM. REMOVE EXISTING ANDOVER CONTROL PANEL AND PROVIDE NEW NIAGARA AX DDC BUILDING CONTROLLER IN ITS PLACE. PROVIDE NEW CAT-5E NETWORK CABLE BETWEEN NEW BUILDING CONTROLLER AND EXISTING VA NETWORK SWITCH.

4 EXISTING AHU SUPPLY FAN VFD TO REMAIN.

5 EXISTING AUXILIARY/INTERFACE PANEL TO REMAIN. REMOVE ALL EXISTING CONTROL COMPONENTS THAT ARE NOT RE-USED IN NEW WORK. TO PROTECT NEW PNEUMATIC AIR COMPONENTS BEING PROVIDED IN EXISTING CABINET UNDER THIS CONTRACT, PROVIDE INLINE PNEUMATIC AIR FILTER DRYER WITH REPLACEABLE MEDIA ELEMENT, IN EXISTING MAIN AIR SUPPLY LINE BEFORE IT ENTERS CABINET. FILTER RATING SHALL EXCEED THE PANEL CONNECTED AIR CONSUMPTION LOAD.

6 EXISTING VA NETWORK CLOSET. CONNECT CAT-5E NETWORK CABLE FROM NEW BUILDING CONTROLLER TO EXISTING VA NETWORK SWITCH IN CLOSET. PROVIDE A MINIMUM OF TWO WEEKS NOTICE TO COR, IN ADVANCE OF ANTICIPATED CONNECTION TO NETWORK SWITCH AND NEED FOR IP ADDRESS.

7 EXISTING AHU WITH STANDALONE CONTROL TO REMAIN - NO SCOPE OF WORK ASSOCIATED WITH THIS UNIT.

8 EXISTING STARTER/DISCONNECTS TO REMAIN, ASSOCIATED WITH HEATING HOT WATER PUMPS.

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Drawing Title: BUILDING 126 FLOOR PLANS
Approved: Chief, Engineering Service

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Building Number: 126 | Checked: PCW | Drawn: JAC
Location: Dayton, Ohio

Date: 05/23/2014
Project No. VA Project No. 552-15-207
Drawing Number: MF126
Dwg. of

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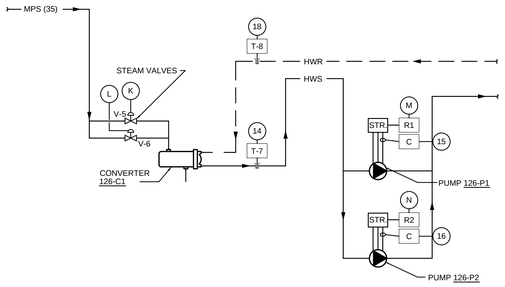
PLOTTED BY: JaCoyle
PLOTTED DATE: May 22, 2014



HOT WATER CONVERTERS AND CIRCULATING PUMPS

HOT WATER CONVERTER AND PUMP CONTROL SEQUENCE

1 GENERAL

1.1 SEQUENCE SHALL HAVE THE ABILITY TO BE INITIATED BY THE DCP OR REMOTELY AT THE ECC. EACH CONVERTER AND PUMP IS SIZED FOR 100% OF THE REQUIRED LOAD.

2 HOT WATER CIRCULATING PUMPS

2.1 THE LEAD HOT WATER PUMP 126-P1 OR STANDBY HOT WATER PUMP 126-P2 SHALL RUN CONTINUOUSLY IN CONJUNCTION WITH HOT WATER CONVERTER 126-C1 TO PROVIDE YEAR-ROUND HOT WATER FOR SPACE TEMPERATURE CONTROL. START STANDBY PUMP 126-P2 UPON FAILURE OF LEAD PUMP. A SEQUENCE PROGRAM SHALL REVERSE THE LEAD AND STANDBY PUMPS EVERY 200 HOURS.

2.2 EACH PUMP HAS AN EXISTING CURRENT SENSING RELAY WHICH SHALL BE UTILIZED TO INDICATE PUMP STATUS.

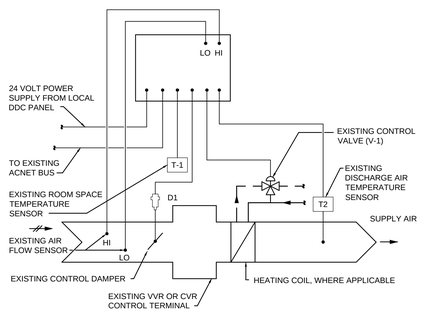
3 HOT WATER CONVERTER

3.1 MODULATING STEAM CONTROL VALVES V-5 AND V-6 (SIZED FOR 1/3 AND 2/3 LOAD) ARE ASSOCIATED WITH THE HOT WATER HEATING SYSTEM. THE STEAM CONTROL VALVES SHALL FAIL CLOSED. VALVES V-5 AND V-6 (SMALLER VALVE TO BE THE LEAD VALVE) SHALL BE CONTROLLED FROM OUTDOOR AIR TEMPERATURE AND LEAVING WATER TEMPERATURE SENSOR T-7 TO DELIVER SUPPLY WATER VARYING AS FOLLOWS:

OUTDOOR AIR TEMP	HOT WATER TEMP
0 DEG. F	180 DEG. F
60 DEG. F	100 DEG. F.

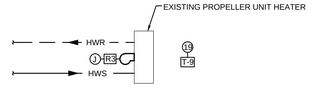
3.2 CONTROL SEQUENCE, BASED ON VALVES V-5 AND V-6, SHALL BE AS FOLLOWS:

MODULATE VALVE V-5 IN RESPONSE TO DCP. ONCE VALVE IS FULL OPEN, MODULATE VALVE V-6 OPEN AND CLOSE VALVE V-5. ONCE VALVE V-6 IS FULL OPEN, AGAIN MODULATE VALVE V-5 IN RESPONSE TO ADDITIONAL STEAM REQUIREMENT. REVERSE CONTROL SEQUENCE ON A DROP IN STEAM CONSUMPTION. VALVES SHALL BE SEPARATE CONTROL POINTS OF THE DCP.



VVR AND CVR TERMINAL CONTROLS

EXISTING VAV AND CAV REHEAT AIR TERMINAL UNITS: EXISTING PRESSURE INDEPENDENT CAV AND VAV RH ATU WITH ANDOVER LTU3 DIRECT DIGITAL CONTROLLERS AND A ROOM TEMPERATURE SENSOR (THERMOSTAT) TO REMAIN (QTY. 21). INTEGRATE EXISTING ATU CONTROLLERS INTO NEW TRIDIUM JACE. PROVIDE JACE WITH ANDOVER DRIVER AS REQUIRED FOR THIS INTEGRATION. COORDINATE DRIVER REQUIREMENTS WITH ENGINEER PRIOR TO ORDERING



PROPELLER UNIT HEATER CONTROL

UPON A DROP IN THIRD FLOOR CEILING PLENUM TEMPERATURE BELOW SETPOINT AS SENSED BY EXISTING PLENUM TEMPERATURE SENSOR T-9, THE DDC SYSTEM SHALL START UNIT HEATER FANS THROUGH EXISTING RELAY. REFER TO AHU SEQUENCES FOR ADDITIONAL INFORMATION.

GENERAL NOTES

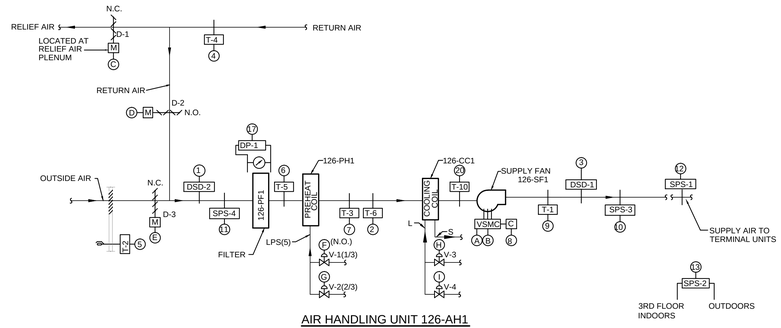
1 A COMPLETE SYSTEM OF AUTOMATIC TEMPERATURE CONTROLS SHALL BE INSTALLED UNDER THIS CONTRACT AS REQUIRED TO ACCOMPLISH THE SEQUENCE OF CONTROL FOR VARIOUS ITEMS OF EQUIPMENT AND SYSTEMS AS DESCRIBED HEREINAFTER. THE SYSTEM SHALL BE A DIRECT DIGITAL CONTROL SYSTEM UTILIZING PNEUMATIC ACTUATION.

2 ALL CONTROL POWER SOURCES REQUIRED SHALL BE PROVIDED UNDER THE ATC WORK. THIS WORK SHALL INCLUDE BUT NOT BE LIMITED TO WIRING, CONDUIT, TRANSFORMERS, RELAYS AND FUSES.

3 POINTS LIST IS SHOWN AS AN AID TO THE CONTRACTOR INDICATING THE MINIMUM POINTS REQUIRED FOR CONTROL AND MONITORING. ALL INPUT AND OUTPUT POINTS, AND THEIR REQUIRED INTERFACE AND ACCESSORY HARDWARE, SHALL BE PROVIDED FOR A COMPLETE AND FUNCTIONAL CONTROL SYSTEM. IF OR WHEN ADDITIONAL POINTS ARE REQUIRED TO ACCOMPLISH THE SEQUENCES OF CONTROL SPECIFIED, THESE POINTS, ALONG WITH ADDITIONAL DIRECT DIGITAL CONTROL PANEL(S) (IF REQUIRED), SHALL ALSO BE PROVIDED.

LEGEND (APPLIES TO AIR HANDLING UNIT 126–AH1)

C	CURRENT SENSING RELAY	TRANSMITS MOTOR CURRENT TO DCP TO INDICATE STATUS OF FANS/PUMPS.
DP-1	DIFFERENTIAL PRESSURE SENSOR	TRANSMITS DIFFERENTIAL PRESSURE TO DCP TO INDICATE FILTER CONDITION
DCP	DIRECT DIGITAL CONTROL PANEL	CONTROLS OPERATION OF AIR HANDLING UNIT IN ACCORDANCE WITH THE SEQUENCE OF OPERATION
D-1	MODULATING RELIEF AIR DAMPER	PROPORTIONS FLOW OF RELIEF AIR IN RESPONSE TO DCP AND CLOSES WHEN SUPPLY FAN STOPS
D-2	MODULATING RETURN AIR DAMPER	PROPORTIONS FLOW OF RETURN AIR IN RESPONSE TO DCP AND OPENS WHEN SUPPLY FAN STOPS
D-3	MODULATING OUTSIDE AIR DAMPER	PROPORTIONS FLOW OF OUTSIDE AIR IN RESPONSE TO DCP AND CLOSES WHEN SUPPLY FAN STOPS
DSD	DUCT SMOKE DETECTORS	PROVIDE SMOKE SIGNAL TO DCP
ECC	ENGINEERING CONTROL CENTER	LOCATED IN BUILDING 310 MEZZANINE FOR MONITORING OF SYSTEM OPERATIONS
R#	FAN/PUMP START-STOP RELAYS	ENABLES/DISABLES HEATING HOT WATER PUMPS AND UNIT HEATER FANS IN RESPONSE TO DCP
SPS-1	SUPPLY DUCT STATIC PRESSURE SENSOR	SENSES AND TRANSMITS DUCT STATIC PRESSURE TO DCP FOR CONTROL AND INDICATION
SPS-2	BUILDING STATIC PRESSURE SENSOR	SENSES AND TRANSMITS BUILDING STATIC PRESSURE TO DCP FOR CONTROL AND INDICATION
SPS-3	SUPPLY DUCT HIGH LIMIT STATIC PRESSURE SENSOR	SENSES AND TRANSMITS DUCT STATIC PRESSURE DOWNSTREAM OF SUPPLY FAN TO DCP
SPS-4	RETURN DUCT HIGH LIMIT STATIC PRESSURE SENSOR	SENSES AND TRANSMITS DUCT STATIC PRESSURE UPSTREAM OF SUPPLY FAN TO DCP
T-1	SUPPLY AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS SUPPLY AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-2	OUTSIDE AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS OUTSIDE AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-3	PREHEAT COIL LEAVING AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS PREHEAT AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-4	RETURN AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS RETURN AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-5	MIXED AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS MIXED AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-6	FREEZESTAT	SHUTS DOWN SUPPLY FAN UPON SENSING FREEZE CONDITION.
T-7	HEATING HOT WATER SUPPLY TEMPERATURE SENSOR	SENSES AND TRANSMITS HEATING HOT WATER SUPPLY TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-8	HEATING HOT WATER RETURN TEMPERATURE SENSOR	SENSES AND TRANSMITS HEATING HOT WATER RETURN TEMPERATURE TO DCP FOR INDICATION ONLY
T-9	FIRST FLOOR CEILING PLENUM TEMPERATURE SENSOR	SENSES AND TRANSMITS CEILING PLENUM TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-10	COOLING COIL LEAVING AIR TEMPERTURE	SENSES AND TRANSMITS COOLING COIL DISCHARGE AIR TEMPERATURE TO DCP FOR INDICATION ONLY
V-1	MODULATING 1/3 STEAM CONTROL VALVE	PROPORTIONS FLOW OF STEAM TO PREHEAT COIL IN RESPONSE TO DCP
V-2	MODULATING 2/3 STEAM CONTROL VALVE	PROPORTIONS FLOW OF STEAM TO PREHEAT COIL IN RESPONSE TO DCP
V-3 V-4	DX COOLING COIL CIRCUIT SOLENOID VALVES	ENABLES/DISABLES STAGES OF DX COOLING IN RESPONSE TO DCP
V-5	MODULATING 1/3 STEAM CONTROL VALVE	PROPORTIONS FLOW OF STEAM TO CONVERTER IN RESPONSE TO DCP
V-6	MODULATING 2/3 STEAM CONTROL VALVE	PROPORTIONS FLOW OF STEAM TO CONVERTER IN RESPONSE TO DCP
VSMC	VARIABLE SPEED MOTOR CONTROLLER WITH MOTOR STARTER	CONTROLS START-STOP AND SPEED OF SUPPLY FAN MOTOR IN RESPONSE TO DCP



AIR HANDLING UNIT 126-AH1

AIR HANDLING UNIT SEQUENCE OF OPERATIONS

A EXTEND AND MODIFY EXISTING CONTROLS AND PROVIDE NEW COMPONENTS AND CONTROLS AS REQUIRED TO ACCOMPLISH THE FOLLOWING CONTROL SEQUENCES.

B 126-AH1

1 ALL TEMPERATURE CONTROL FUNCTIONS LISTED ARE CURRENTLY CONTROLLED BY EXISTING ANDOVER CONTROL SYSTEM. ANDOVER SYSTEM SHALL BE REMOVED, AND ALL CONTROL FUNCTIONS SHALL BE CONTROLLED BY THE NEW TRIDIUM SYSTEM, AS AN EXTENSION OF THE EXISTING CAMPUS CONTROLS NETWORK.

2 THE NEW TRIDIUM CONTROLS SHALL PROVIDE THE FOLLOWING CONTROL FUNCTIONS:
- A. PREHEAT COIL (1/3 VALVE, AND 2/3 VALVE)
- B. COOLING COIL VALVE CONTROL
- C. VARIABLE SPEED DRIVE CONTROL
- D. OCCUPIED/UNOCCUPIED CONTROL
- E. SAFETIES AND SHUTDOWN

A. AIR HANDLER OCCUPIED MODE

WHEN THE OUTSIDE AIR CONDITIONS ARE ABLE TO PRODUCE A MIXED AIR TEMPERATURE OF 55 DEGREES F. THE RETURN AIR DAMPER AND OUTSIDE AIR DAMPER SHALL MODULATE TO MAINTAIN A 55 DEGREE F. DISCHARGE AIR TEMPERATURE. THE FAN SPEED SHALL BE MODULATED TO MAINTAIN A MINIMUM DUCT STATIC PRESSURE AS SENSED BY NEW DUCT MOUNTED STATIC SENSOR IN THE NORTH MAIN DUCT. THE REMOTE RELIEF AIR DAMPER SHALL BE MODULATED TO MAINTAIN A BUILDING POSITIVE STATIC PRESSURE RELATIVE TO OUTDOOR PRESSURE AS SENSED BY EXISTING SPACE PRESSURE SENSOR ABOVE THE 3RD FLOOR CEILING. WHEN OUTDOOR AIR CONDITIONS ARE SUCH THAT THE MIXED AIR TEMPERATURE CANNOT BE HELD BELOW 60 DEGREES F. THE CONTROLS SHALL ENABLE THE DX CONDENSING UNIT, THE CONDENSING UNIT SHALL BE CYCLED IN RESPONSE TO THE RETURN AIR TEMPERATURE. WHEN THE MECHANICAL COOLING IS ENABLED, THE OUTSIDE AIR DAMPER SHALL BE SET AT ITS MINIMUM POSITION AND THE RELIEF AIR DAMPER SHALL BE MODULATED TO MAINTAIN A POSITIVE BUILDING STATIC PRESSURE AS PREVIOUSLY DESCRIBED. WHEN THE MIXED AIR TEMPERATURE DROPS BELOW 55 DEGREES F. THE 1/3 AND 2/3 STEAM CONTROL VALVES SHALL OPERATE AS TABLED BELOW TO MAINTAIN A 55 DEGREE F UNIT DISCHARGE TEMPERATURE. WHEN THE MIXED AIR TEMPERATURE DROPS BELOW 40 DEGREES F, THE 2/3 VALVE SHALL BE FULL OPEN AND THE 1/3 VALVE SHALL MODULATE TO MAINTAIN A PREHEAT DISCHARGE TEMPERATURE OF 55 DEGREES F.

PREHEAT DISCHARGE TEMP

BELOW SETPOINT		ABOVE SETPOINT	
1/3 VALVE	2/3 VALVE	1/3 VALVE	2/3 VALVE
0-90%	CLOSED	70 - 0%	CLOSED
CLOSED	45-100%	CLOSED	100 - 35%
0-100%	100% OPEN	100 - 0%	100% OPEN

B. AIR HANDLER UNOCCUPIED MODE

WHEN THE CONTROL SYSTEM DICTATES THAT THE BUILDING IS IN THE UNOCCUPIED TIME MODE, THE AH UNIT WILL BE STOPPED WITH THE OUTSIDE DAMPERS CLOSED, THE RELIEF DAMPERS CLOSED AND THE RETURN DAMPERS OPENED. IF THE SPACE TEMPERATURE IN ANY ROOM GOES ABOVE 80 DEGREES F. THE UNIT FAN WILL RUN AND THE ECONOMIZER WILL BE USED IN AN ATTEMPT TO MAINTAIN A TEMPERATURE BELOW 85 DEGREES F. AND ABOVE 75 DEGREES F. IF THE TEMPERATURE RISES ABOVE 85 DEGREES F. FOR MORE THAN 1 HOUR OR HIGHER THAN 87 DEGREES F. AT ANY TIME, THE UNIT SHALL THEN BE CONTROLLED IN THE OCCUPIED MODE UNTIL SPACE TEMPERATURES ARE BROUGHT BACK TO 75 DEGREES F. THE ABOVE DESCRIBED SEQUENCE IS ONLY APPLICABLE WHEN OUTDOOR AIR TEMPERATURES ARE ABOVE 55 DEGREES F. DURING UNOCCUPIED MODE AND WHEN OUTDOOR TEMPERATURES ARE BELOW 55 DEGREES F. THE CONTROL SYSTEM SHALL OPERATE THE UNIT HEATERS ABOVE THE THIRD FLOOR CEILING AND MAINTAIN A 65 DEGREES F. TEMPERATURE ABOVE THE THIRD FLOOR CEILING. IF ANY SPACE TEMPERATURE FALLS BELOW 60 DEGREES F, THE UNIT FAN SHALL OPERATE AND BOTH THE PREHEAT COIL VALVES SHALL OPERATE AT FULL OPEN TO RAISE THE TEMPERATURE OF THE SPACES ABOVE 65 DEGREES F.

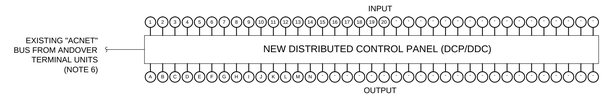
C. AIR HANDLER SMOKE CONTROL

UPON SENSING SMOKE AT EITHER OF THE EXISTING DUCT MOUNTED SMOKE DETECTORS LOCATED IN THE SUPPLY AND RETURN AIR STREAM, THE FOLLOWING SHALL OCCUR:

1. THE SUPPLY FAN DE-ENERGIZES;
2. THE OUTDOOR AIR DAMPER CLOSES;
3. THE RETURN AIR DAMPER OPENS;
4. THE RELIEF AIR DAMPER CLOSES.

D. SAFETIES - SHUTDOWN

THE EXISTING SAFETIES AND OVERRIDES FOR FREEZESTATS AND SMOKE DETECTORS SHALL BE FULLY FUNCTIONAL. ALL SAFETIES SHALL FUNCTION IN THE HAND, OFF OR AUTO POSITIONS.



CONTROL PANEL 126-AH1

CONTROL PANEL 126-AH1 POINTS LIST

	POINT ID	DEVICE TAG	DEVICE DESCRIPTION	POINT TYPE DI	DO	AI	AO
(NOTE 5)	1	DSD-2	RETURN AIR DUCT SMOKE DETECTOR (FIRE SYSTEM SHUTDOWN)	X			
(NOTE 5)	2	T-6	FREEZESTAT	X			
(NOTE 5)	3	DSD-1	SUPPLY AIR DUCT SMOKE DETECTOR (FIRE SYSTEM SHUTDOWN)	X			
(NOTE 1)	4	T-4	RETURN AIR TEMPERATURE SENSOR			X	
(NOTE 1)	5	T-2	OUTSIDE AIR TEMPERATURE SENSOR (GLOBAL POINT)			X	
(NOTE 1)	6	T-5	MIXED AIR TEMPERATURE SENSOR			X	
(NOTE 5)	7	T-3	PREHEAT COIL LEAVING AIR TEMPERATURE SENSOR			X	
(NOTE 5)	8	C	SUPPLY FAN STATUS CURRENT SWITCH	X			
(NOTE 1)	9	T-1	SUPPLY AIR TEMPERATURE SENSOR			X	
(NOTE 1)	10	SPS-3	SUPPLY DUCT HIGH STATIC SAFETY	X			
(NOTE 1)	11	SPS-4	RETURN DUCT HIGH STATIC SAFETY	X			
(NOTE 1)	12	SPS-1	SUPPLY DUCT STATIC PRESSURE SENSOR			X	
(NOTE 1)	13	SPS-2	BUILDING STATIC PRESSURE SENSOR			X	
(NOTE 5)	14	T-7	HEATING HOT WATER SYSTEM SUPPLY TEMPERATURE			X	
(NOTE 5)	15	C	HOT WATER PUMP 126-P1 STATUS CURRENT SWITCH	X			
(NOTE 5)	16	C	HOT WATER PUMP 126-P2 STATUS CURRENT SWITCH	X			
(NOTE 4)	17	DP-1	PRE-FILTER PRESSURE DROP			X	
(NOTE 5)	18	T-8	HEATING HOT WATER SYSTEM RETURN TEMPERATURE			X	
(NOTE 5)	19	T-9	THIRD FLOOR CEILING PLENUM TEMPERATURE SENSOR			X	
(NOTE 4)	20	T-10	COOLING COIL LEAVING AIR TEMPERATURE SENSOR			X	
(NOTE 3)	A	VSMC	SUPPLY FAN START-STOP	X			
(NOTE 5)	B	VSMC	SUPPLY FAN VARIABLE SPEED MOTOR CONTROLLER				X
(NOTE 2)	C	D-1	MODULATING RELIEF AIR DAMPER				X
(NOTE 2)	D	D-2	MODULATING RETURN AIR DAMPER				X
(NOTE 2)	E	D-3	MODULATING OUTSIDE AIR DAMPER				X
(NOTE 2)	F	V-1	MODULATING 1/3 STEAM PREHEAT COIL VALVE				X
(NOTE 2)	G	V-2	MODULATING 2/3 STEAM PREHEAT COIL VALVE				X
(NOTE 3)	H	V-3	COOLING COIL CIRCUIT #1 SOLENOID VALVE (FIRST STAGE OF DX COOLING)	X			
(NOTE 3)	I	V-4	COOLING COIL CIRCUIT #2 SOLENOID VALVE (SECOND STAGE OF DX COOLING)	X			
(NOTE 3)	J	R3	THIRD FLOOR CEILING PLENUM PROPELLER UNIT HEATERS - FAN START-STOP	X			
(NOTE 2)	K	V-5	CONVERTER 126-C1-1/3 STEAM CONTROL VALVE				X
(NOTE 2)	L	V-6	CONVERTER 126-C1-2/3 STEAM CONTROL VALVE				X
(NOTE 3)	M	R1	HOT WATER PUMP 126-P1 START/STOP RELAY	X			
(NOTE 3)	N	R2	HOT WATER PUMP 126-P2 START/STOP RELAY	X			

NOTES:

1 REMOVE EXISTING ELECTRONIC SENSOR AND REPLACE WITH NEW. REFER TO 23 09 23 FOR NEW SENSOR SPECS. RE-USE EXISTING WIRING BETWEEN SENSOR LOCATION AND NEW BUILDING CONTROLLER.

2 EXISTING SYSTEM LEVEL PNEUMATIC CONTROL DEVICE TO REMAIN. PROVIDE NEW E/P TRANSDUCER WITHIN NEW CONTROL CABINET, TO REPLACE EXISTING TRANSDUCER, AND RE-PIPE EXISTING PNEUMATIC DEVICE TO NEW E/P TRANSDUCER.

3 EXISTING ELECTRONIC RELAY TO REMAIN, SHALL BE RE-USED.

4 POINT DOES NOT CURRENTLY EXIST. PROVIDE POINT AS PART OF THIS PROJECT.

5 EXISTING ELECTRONIC SENSOR/DEVICE TO REMAIN, SHALL BE RE-USED.

6 DDC ZONE CONTROL IS EXISTING ANDOVER TERMINAL UNIT CONTROLLERS - REFER TO VVR AND CVR CONTROL TERMINAL DIAGRAM ON THIS SHEET. INTEGRATE EXISTING ANDOVER ZONE CONTROLS INTO NEW DDC BUILDING CONTROLLER, PROVIDE EQUIPMENT AND FLOOR PLAN GRAPHICS AT ECC.

Revisions	Date

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PROJECT NO. 2013-04011 FIRM LICENSE NO. 01528

Drawing Title: BUILDING 126 CONTROLS AND AUTOMATION
Approved: Chief, Engineering Service

Project Title: DVAMC IMPROVE BUILDING AUTOMATION SYSTEM
Building Number: 126 | Checked: PCW | Drawn: JAC
Location: Dayton, Ohio

Date: 05/23/2014
Project No. VA Project No. 552-15-207
Drawing Number: MC126
Dwg. of

Planning & Design
Department of Veterans Affairs

PROJECT NO. 2013-04011
PLOTTED BY: JACoyle
PLOT DATE: May 22, 2014
HEAPY ENGINEERING
DAYTON/COLUMBUS, OHIO & INDIANAPOLIS, INDIANA
MECHANICAL, ELECTRICAL, COMMISSIONING, TECHNOLOGY

GENERAL NOTES

A REFER TO SHEET M001 FOR LEGEND, ABBREVIATIONS, AND ADDITIONAL GENERAL NOTES.

⬡ NOTES

1 EXISTING STEAM BOILER TO REMAIN (STEAM CAPACITY).

2 EXISTING PLANT MASTER AND BOILER COMBUSTION CONTROL PANEL ENCLOSURE TO REMAIN. REMOVE EXISTING PANEL COMPONENTS ONLY AS REQUIRED TO INSTALL NEW PLANT MASTER CONTROLLER & ASSOCIATED TOUCH SCREEN IN MIDDLE CENTER OF EXISTING ENCLOSURE. REMAINDER OF COMPONENTS SHALL BE ABANDONED IN PLACE.

3 EXISTING ALLEN BRADLEY PANEL TO REMAIN, FOR WATER TOWER LEVEL MONITORING AND CONTROL OF TOWER FILL PUMPS. PROVIDE COMMUNICATIONS GATEWAY AND INTEGRATE EXISTING WATER TOWER CONTROLS INTO NEW BUILDING CONTROLLER. PROVIDE GRAPHICS AT ECC.

4 PROVIDE NEW NIAGARA AX DDC BUILDING CONTROLLER, WITH CAT-5E NETWORK CABLE BETWEEN NEW BUILDING CONTROLLER AND EXISTING VA NETWORK SWITCH. EXTEND AND CONNECT POWER TO BUILDING CONTROLLER FROM ADJACENT ALLEN BRADLEY PANEL

5 EXISTING BOILER FORCED DRAFT FAN VFD TO REMAIN. INTEGRATE INTO NEW COMBUSTION CONTROLLER.

6 EXISTING BOILER INDUCED DRAFT FAN VFD TO REMAIN. INTEGRATE INTO NEW COMBUSTION CONTROLLER.

7 EXISTING VA NETWORK CLOSET. CONNECT CAT-5E NETWORK CABLE FROM NEW BUILDING CONTROLLER TO EXISTING VA NETWORK SWITCH IN CLOSET. PROVIDE A MINIMUM OF TWO WEEKS NOTICE TO COR, IN ADVANCE OF ANTICIPATED CONNECTION TO NETWORK SWITCH AND NEED FOR IP ADDRESS.

8 PROVIDE NEW BOILER COMBUSTION CONTROLLER IN NEW FREESTANDING PANEL ENCLOSURE, WITH TOUCH SCREEN INTERFACE, PER SPECS. EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE, ALL EXISTING BOILER CONTROL DEVICES, SENSORS, TRANSMITTERS, ETC. ARE EXISTING TO REMAIN, AND SHALL BE RE-USED. EXTEND AND CONNECT POWER FOR PANEL FROM NEW CIRCUIT PROVIDED IN EXISTING PANEL "B": ONE DEDICATED CIRCUIT PER BOILER. INTEGRATE THE FOLLOWING POINTS ASSOCIATED WITH NEW COMBUSTION CONTROLLERS INTO CAMPUS BAS THROUGH NEW BUILDING CONTROLLER, AND PROVIDE EQUIPMENT AND FLOOR PLAN GRAPHICS AT ECC: STATUS OF EACH BOILER (ON/OFF), PRESSURE (PSIG) AND STEAM FLOW RATE (LB/HR) OF EACH INDIVIDUAL BOILER OUTLET AND OF COMMON PLANT HEADER, FUEL SELECTOR SWITCH POSITION. REFER TO 23 09 11 FOR MORE DETAILED INFORMATION ON BOILER CONTROLS.

9 EXISTING WATER TOWER LEVEL MONITORING AND PUMP CONTROL WORKSTATION. ALL POINTS ACCESSIBLE ON THIS WORKSTATION SHALL BE INTEGRATED INTO CAMPUS BMS THROUGH NEW BUILDING CONTROLLER.

10 EXISTING FLOAT-CONTROLLED INLET WATER CONTROL VALVE WITH PNEUMATIC ACTUATOR, ASSOCIATED WITH EXISTING FEEDWATER DEAERATOR. REMOVE EXISTING FLOAT CONTROLS AND PROVIDE CURRENT TO PRESSURE TRANSDUCER TO CONTROL EXISTING VALVE ACTUATOR WITH ELECTRONIC SIGNAL FROM NEW PLANT MASTER CONTROL PANEL. EXTEND WIRING IN CONDUIT FROM NEW PLANT MASTER CONTROL PANEL TO NEW I/P TRANSDUCER TO ACCOMPLISH THIS CONTROL. D.A. TANK WATER LEVEL SIGNAL TO PLANT MASTER CONTROLLER IS EXISTING TO REMAIN.

11 EXISTING NATURAL GAS AND FUEL OIL CONTROL VALVES INSTALLED ON BOILER #1 TO REMAIN.

12 REMOVE EXISTING NATURAL GAS AND FUEL OIL CONTROL VALVES. NEW NATURAL GAS AND FUEL OIL CONTROL VALVES FOR BOILER #2 & #3 WILL BE FURNISHED BY VA AND SHALL BE INSTALLED BY CONTRACTOR UNDER THIS CONTRACT.

13 PROVIDE RETROFIT OF V-PORT BALL IN EXISTING VALVES, TO INCREASE FUEL FLOW CAPABILITY TO EXCEED BOILER STEAM CAPACITY (APPROXIMATELY 51,300 CFM NATURAL GAS FLOW AND 310 GPM FUEL OIL FLOW FOR BOILERS 1 & 2; 25,600 CFM NATURAL GAS FLOW AND 155 GPM FUEL OIL FLOW FOR BOILER 3). EXISTING FUEL OIL CONTROL VALVE: TRIAC CONTROLS MODEL V8C-TS-075/WEA2-XX-6 AND SERIAL 0084345-4-3-2. EXISTING NATURAL GAS CONTROL VALVE: TRIAC CONTROLS MODEL V9C-FS-3--/WED2-XX-6 AND SERIAL 0084345-15-3-3.

14 REMOVE EXISTING NATURAL GAS AND FUEL OIL CONTROL VALVES. PROVIDE NEW NATURAL GAS AND FUEL OIL CONTROL VALVES OF SAME MANUFACTURER AND MODEL AS EXISTING BOILER #1, 2, AND 3 FUEL CONTROL VALVES. FLOW CAPABILITY OF NEW FUEL CONTROL VALVES SHALL EXCEED BOILER STEAM CAPACITY(APPROXIMATELY 25,600 CFM NATURAL GAS FLOW AND 155 GPM FUEL OIL FLOW)

15 REMOVE EXISTING FORCED DRAFT AND INDUCED DRAFT CONTROL DAMPER ACTUATORS. NEW 120V FORCED DRAFT AND INDUCED DRAFT DAMPER ACTUATORS FOR ALL FOUR BOILERS WILL BE FURNISHED BY VA AND SHALL BE INSTALLED BY CONTRACTOR UNDER THIS CONTRACT. EXTEND AND CONNECT POWER TO NEW DAMPER ACTUATORS FOR EACH BOILER FROM COMBUSTION CONTROL PANEL CIRCUIT ASSOCIATED WITH THAT BOILER. NEW INDUCED DRAFT DAMPER ACTUATORS ARE AS FOLLOWS: BECK MODEL11-159, WITH CONTACTLESS SENSOR FOR POSITION SENSING, 4-20 mA SIGNAL, DIGITAL CONTROL MODULE WITH HART COMMUNICATIONS, WIRING DIAGRAM 17-5122-92, LINKAGE KIT 20-1730-05. NEW FORCED DRAFT DAMPER ACTUATORS ARE AS FOLLOWS: BECK MODEL31-M50, WIRING DIAGRAM 17-3001-05, LINKAGE KIT 14-7990-XX, OUTLINE DIMENSION DRAWING 18-0031-01, SUPPLIED WITH L-BRACKET AND CRANK ARM FOR FIELD INSTALLATION TO EXISTING EQUIPMENT.

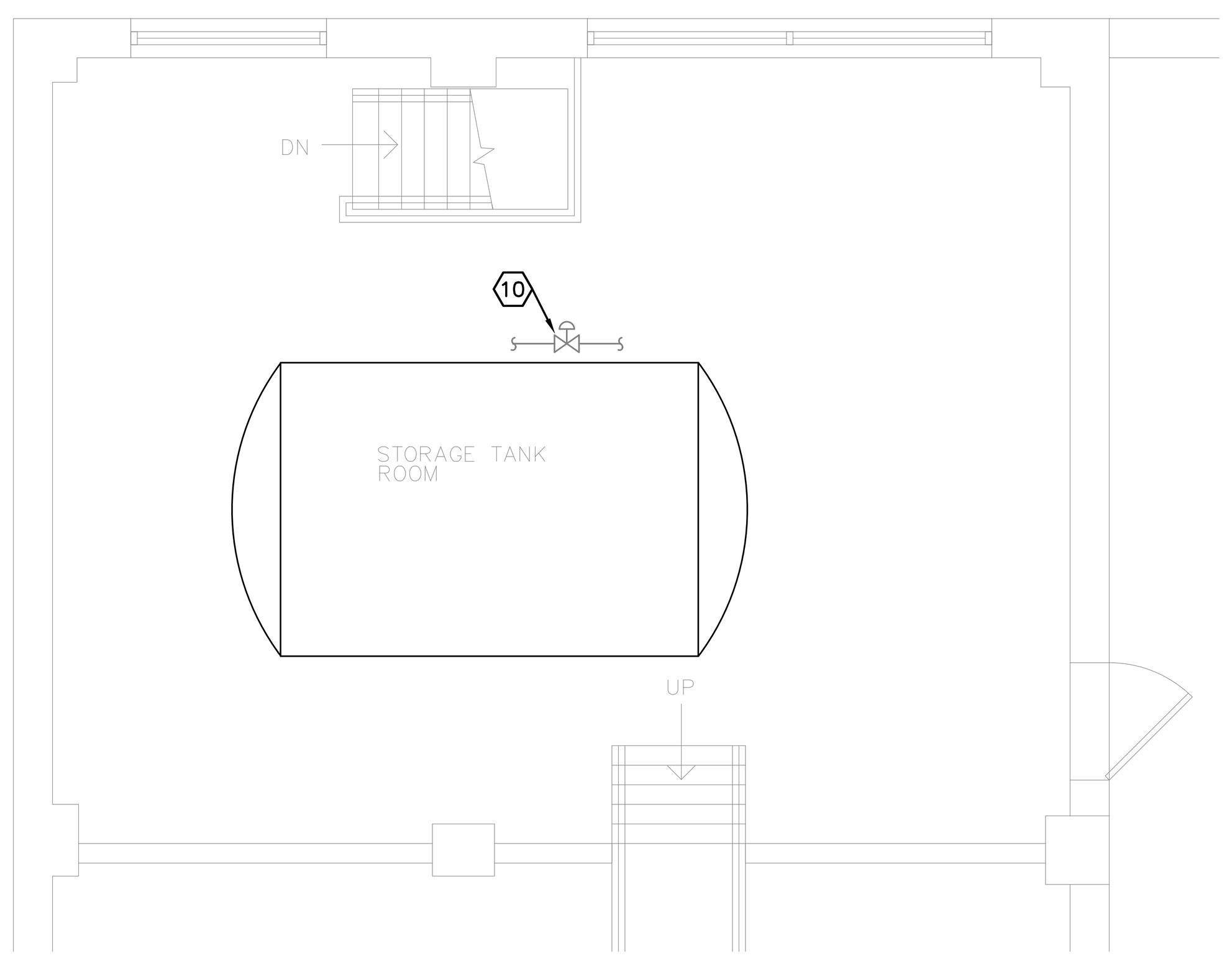
16 EXISTING BOILER FEEDWATER CONTROL VALVE TO REMAIN. PROVIDE RETROFIT OF EXISTING VALVE ACTUATOR CONTROL BOARD, TO CONVERT ACTUATOR FROM 3-WIRE TO 4-20 mA SIGNAL. EXISTING FEEDWATER CONTROL VALVE ACTUATOR: TRIAC CONTROLS MODEL WE-1350.

17 EXISTING BURNER MANAGEMENT SYSTEM TO REMAIN.

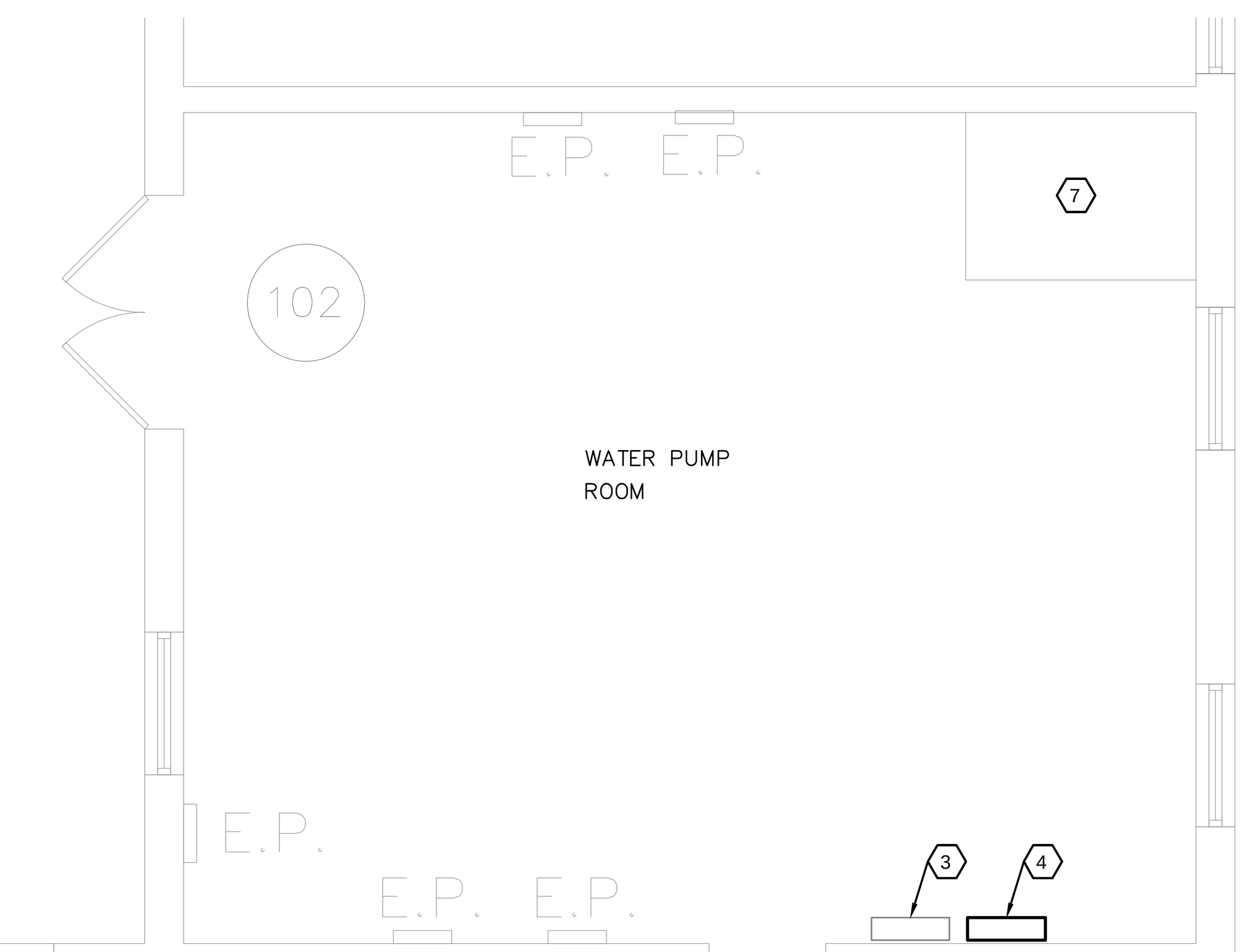
18 PROVIDE FOUR NEW 120V/20A-1P CIRCUIT BREAKERS IN EXISTING CUTLER-HAMMER PRL PANEL. EACH NEW CIRCUIT SHALL SERVE ALL POWER REQUIREMENTS OF A SINGLE BOILER (NEW COMBUSTION CONTROLS, FD & ID DAMPER ACTUATORS, ETC.).

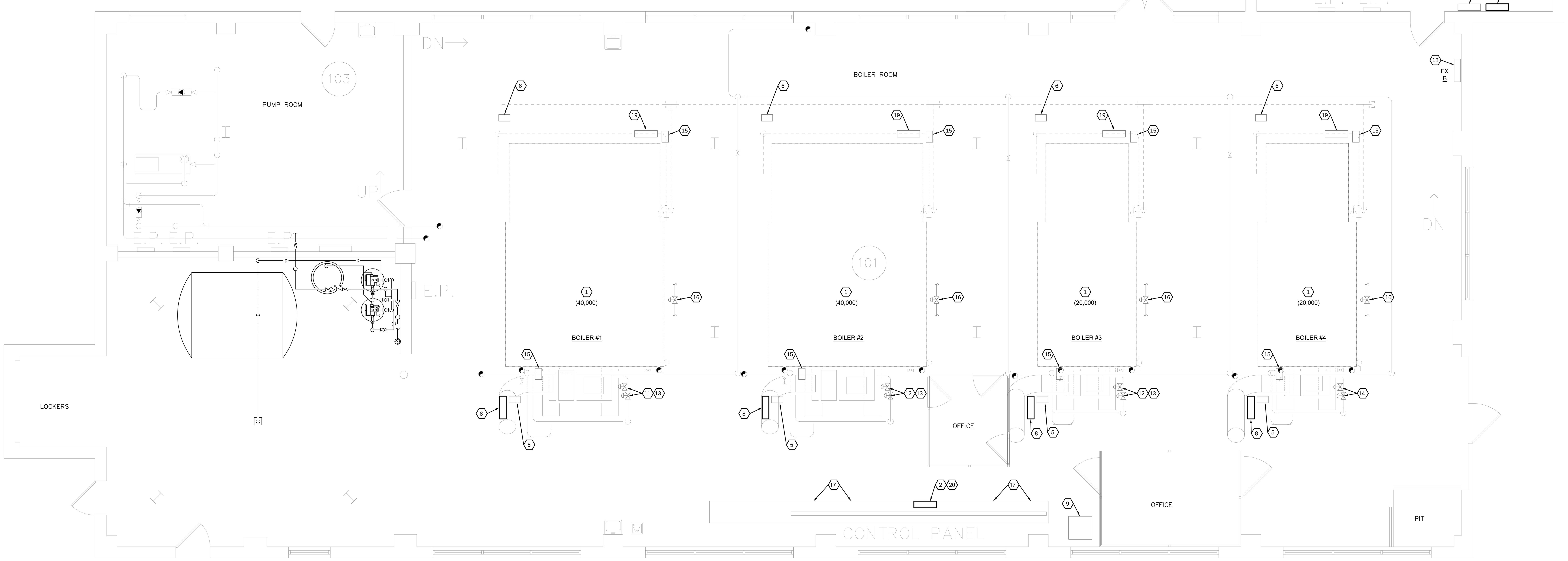
19 EXISTING FLUE GAS OXYGEN ANALYZER WITH 4-20 mA OUTPUT TO REMAIN. INTEGRATE INTO NEW COMBUSTION CONTROLLER.

20 ALL EXISTING PLANT MASTER CONTROLLER INPUT & OUTPUT POINTS SHALL BE INTEGRATED TO NEW PLANT MASTER CONTROLLER, INCLUDING BUT NOT LIMITED TO: D.A. TANK WATER LEVEL, D.A. TANK FLOW, CONDENSATE TEMPERATURE, AMBIENT AIR TEMPERATURE, FLUE GAS TEMPERATURE IN & OUT OF ECONOMIZER, FEEDWATER TEMPERATURE IN & OUT OF ECONOMIZER, MAIN STEAM HEADER PRESSURE & FLOW RATE. REFER TO 23 09 11 FOR ADDITIONAL INFORMATION.



PARTIAL FOURTH FLOOR PLAN
SCALE: 1/4" = 1'-0"





FIRST FLOOR PLAN
SCALE: 1/4" = 1'-0"

Revisions		Date

STATE OF OHIO — GARY S. EODICE E-52755 — REGISTERED PROFESSIONAL ENGINEER

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PROJECT NO. 2013-04011 FIRM LICENSE NO. 01528

Drawing Title: BUILDING 147 FLOOR PLANS

Approved: Chief, Engineering Service

Project Title: DVAMC IMPROVE BUILDING AUTOMATION SYSTEM

Building Number: 147 | Checked: PCW | Drawn: JAC

Location: Dayton, Ohio

Date: 05/23/2014

Project No.: VA Project No. 552-15-207

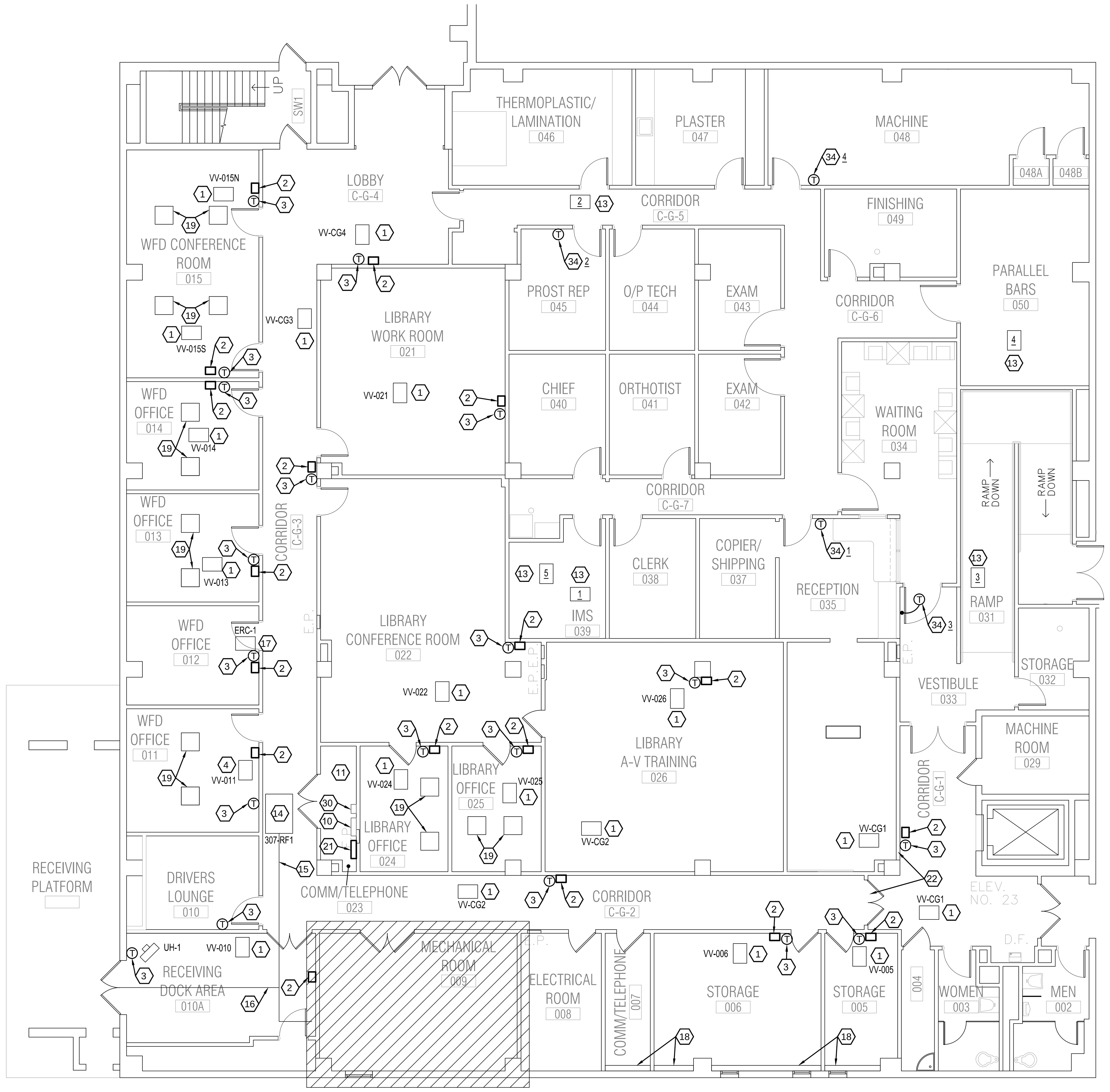
Drawing Number: MF147

Dwg. of

Planning & Design

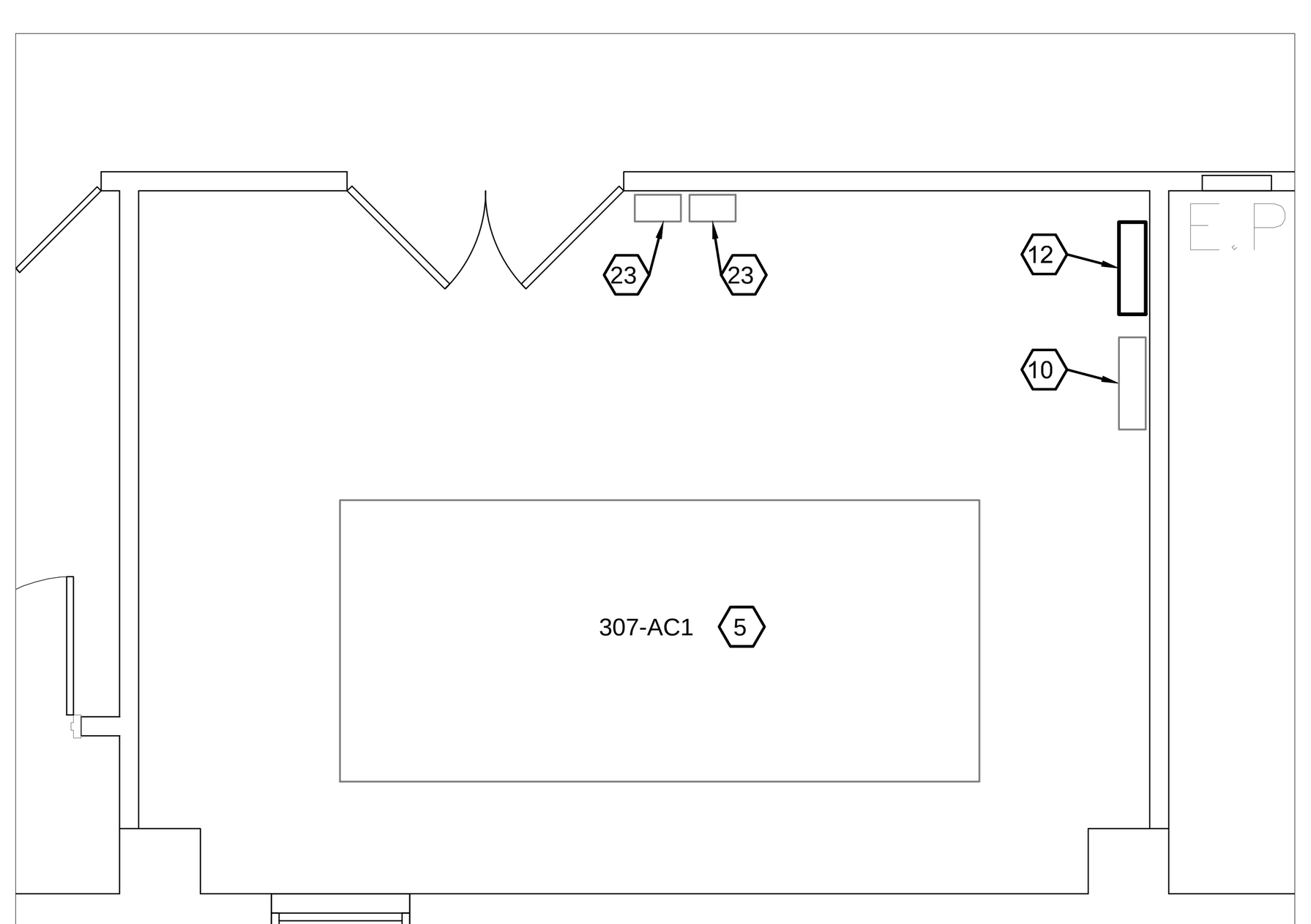
Department of Veterans Affairs

PROJECT NO. 2013-04011
HEAPY ENGINEERING
DAYTON/COLUMBUS, OHIO & INDIANAPOLIS, INDIANA
MECHANICAL ELECTRICAL COMMISSIONING TECHNOLOGY
PLOTTED BY: JACoyle
PLOT/EDIT DATE: May 22, 2014

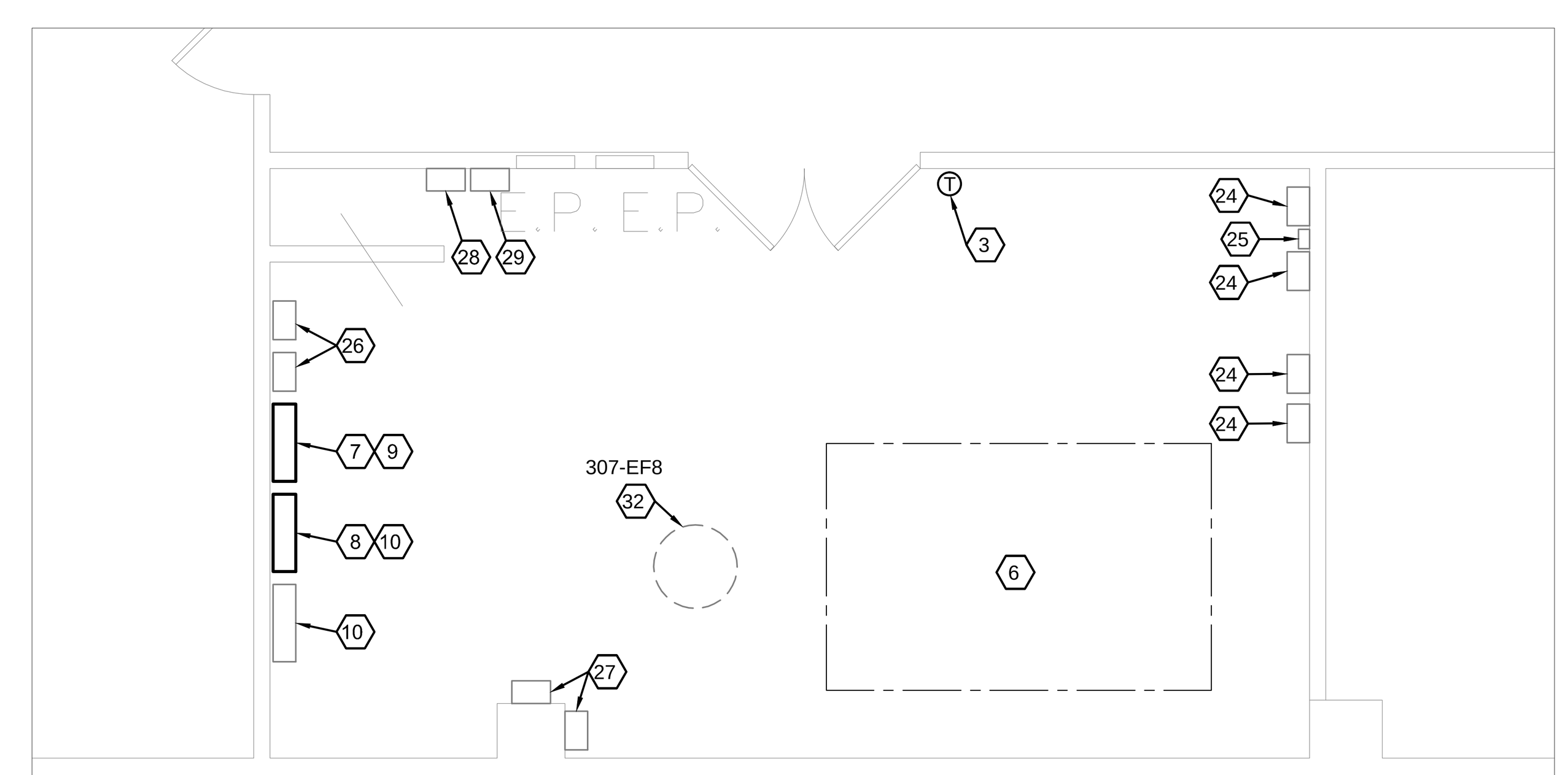


GROUND FLOOR PLAN

FIRST FLOOR PLAN



ENLARGED GROUND FLOOR MECHANICAL ROOM PLAN



ENLARGED FIRST FLOOR MECHANICAL ROOM PLAN

GENERAL NOTES

A REFER TO SHEET M001 FOR LEGEND, ABBREVIATIONS, AND ADDITIONAL GENERAL NOTES.

NOTES

1 EXISTING VARIABLE VOLUME TERMINAL UNIT WITH PNEUMATIC DAMPER ACTUATOR TO REMAIN, EQUIPMENT TAG AS INDICATED. REFER TO SHEETS MC307A & MC307B FOR CONTROLS.

2 REMOVE EXISTING E-P TRANSDUCER ASSOCIATED WITH ZONE TEMPERATURE CONTROL, LOCATED IN HINGED CONTROL CABINET ABOVE CEILING, AND REPLACE WITH NEW. REFER TO SHEETS MC307A & MC307B FOR MORE INFORMATION.

3 REMOVE EXISTING WALL MOUNTED ELECTRONIC SPACE TEMPERATURE SENSOR AND REPLACE WITH NEW. RE-USE EXISTING WIRING.

4 EXISTING VARIABLE VOLUME REHEAT TERMINAL UNIT WITH PNEUMATIC DAMPER AND VALVE ACTUATORS TO REMAIN, EQUIPMENT TAG AS INDICATED. REFER TO SHEETS MC307A & MC307B FOR CONTROLS.

5 EXISTING AIR HANDLING UNIT TO REMAIN. REFER TO SHEETS MC307A & MC307B FOR CONTROLS.

6 EXISTING SHELL & TUBE STEAM TO HEATING HOT WATER CONVERTER TO REMAIN. REFER TO SHEET MC307B FOR CONTROLS SCOPE ASSOCIATED WITH THIS SYSTEM.

7 EXISTING ANDOVER PANEL 256-M (PANEL #1) CONTROLS ROOF MOUNTED AHU, HEATING HOT WATER SYSTEM, AND EXHAUST FANS. REMOVE EXISTING ANDOVER CONTROL PANEL AND PROVIDE NEW DDC PROGRAMMABLE EQUIPMENT CONTROLLER (PEC) IN ITS PLACE, FOR CONTROL OF ROOF MOUNTED AHU AND ASSOCIATED VVT TERMINAL UNITS & EXHAUST FANS. PROVIDE NEW CAT-5E NETWORK CABLE BETWEEN NEW PEC AND EXISTING VA NETWORK SWITCH. RE-USE EXISTING POWER CIRCUIT - DISCONNECT FROM EXISTING PANEL AND RECONNECT TO NEW.

8 EXISTING ANDOVER PANEL 256-S (PANEL #2) CONTROLS VVT ZONE BOXES. REMOVE EXISTING ANDOVER CONTROL PANEL AND PROVIDE NEW DDC BUILDING CONTROLLER IN ITS PLACE, FOR CONTROL OF HEATING HOT WATER SYSTEM. PROVIDE NEW CAT-5E NETWORK CABLE BETWEEN NEW BUILDING CONTROLLER AND EXISTING VA NETWORK SWITCH. RE-USE EXISTING POWER CIRCUIT - DISCONNECT FROM EXISTING PANEL AND RECONNECT TO NEW.

9 EXISTING ANDOVER CMX 240 NETWORK MANAGER PANEL (ON WALL BELOW PANEL #1). REMOVE EXISTING ANDOVER CONTROL PANEL AND ASSOCIATED WIRING, MODEM, BACKUP POWER SUPPLIES, ETC.

10 EXISTING AUXILIARY/INTERFACE CONTROL PANEL TO REMAIN (ON WALL ABOVE PANEL #2). REMOVE ALL EXISTING CONTROL COMPONENTS THAT ARE NOT RE-USED IN NEW WORK. TO PROTECT NEW PNEUMATIC AIR COMPONENTS BEING PROVIDED IN EXISTING CABINET UNDER THIS CONTRACT, PROVIDE INLINE PNEUMATIC AIR FILTER DRYER WITH REPLACEABLE MEDIA ELEMENT, IN EXISTING MAIN AIR SUPPLY LINE BEFORE IT ENTERS CABINET. FILTER RATING SHALL EXCEED THE PANEL CONNECTED AIR CONSUMPTION LOAD.

11 EXISTING VA NETWORK CLOSET. CONNECT CAT-5E NETWORK CABLE FROM ALL NEW BUILDING CONTROLLERS TO EXISTING VA NETWORK SWITCH IN CLOSET. PROVIDE A MINIMUM OF TWO WEEKS NOTICE TO COR, IN ADVANCE OF ANTICIPATED CONNECTION TO NETWORK SWITCH AND NEED FOR IP ADDRESS.

12 EXISTING ANDOVER PANEL 256-S (PANEL #5) CONTROLS AIR HANDLING UNIT 307-AC1 AND VVT ZONE BOXES. REMOVE EXISTING ANDOVER CONTROL PANEL AND PROVIDE NEW DDC BUILDING CONTROLLER IN ITS PLACE, FOR CONTROL OF 307-AC1 AND ASSOCIATED VVT ZONE BOXES. PROVIDE NEW CAT-5E NETWORK CABLE BETWEEN NEW BUILDING CONTROLLER AND EXISTING VA NETWORK SWITCH. RE-USE EXISTING POWER CIRCUIT - DISCONNECT FROM EXISTING PANEL AND RECONNECT TO NEW.

13 EXISTING VAV REHEAT TERMINAL UNIT WITH LON DDC CONTROLLER TO REMAIN, EQUIPMENT TAG AS INDICATED. PROVIDE LON COMMUNICATIONS BUS BETWEEN ALL BOXES AND BACK TO NEW BUILDING CONTROLLER IN GROUND FLOOR MECHANICAL RM. (PANEL #5). INTEGRATE ALL AVAILABLE POINTS FROM EXISTING BOX CONTROLLER INTO CAMPUS BAS THROUGH BUILDING CONTROLLER, AND PROVIDE GRAPHICS AT CENTRAL SERVER (ECC). PROVIDE NEW BUILDING CONTROLLER WITH LON DRIVER TO ACCOMPLISH THIS INTEGRATION.

14 EXISTING REMOTE RETURN/RELIEF FAN ASSOCIATED WITH AIR HANDLING UNIT 307-AC1 TO REMAIN. REFER TO SHEET MC307A FOR CONTROL.

15 EXISTING RETURN DUCT SMOKE DETECTOR ASSOCIATED WITH AIR HANDLING UNIT 307-AC1 TO REMAIN. REFER TO SHEET MC307A FOR CONTROL.

16 EXISTING RELIEF AIR DAMPER ASSOCIATED WITH AIR HANDLING UNIT 307-AC1 TO REMAIN. REFER TO SHEET MC307A FOR CONTROL.

17 EXISTING ELECTRIC DUCT HEATER TO REMAIN. EXISTING PRESSURE-OPERATED CONTACTOR IS LOCATED ADJACENT TO HEATER, ABOVE CEILING. REFER TO SHEET MC307A FOR CONTROLS.

18 EXISTING HOT WATER FIN TUBE TO REMAIN. EXISTING PNEUMATIC CONTROL VALVE ASSOCIATED WITH FIN TUBE IS LOCATED ABOVE GROUND FLOOR CEILING. REFER TO SHEETS MC307A, MC307B, & MC307C FOR CONTROLS.

19 EXISTING ELECTRIC RADIANT HEATING PANEL TO REMAIN. EXISTING PRESSURE-OPERATED CONTACTOR IS LOCATED ADJACENT TO PANELS, ABOVE CEILING. REFER TO SHEETS MC307A, MC307B, & MC307C FOR CONTROLS.

20 EXISTING ANDOVER PANEL 256-S (PANEL #3) CONTROLS EXISTING TEMPERATURE ZONES. REMOVE EXISTING ANDOVER CONTROL PANEL AND PROVIDE NEW DDC PROGRAMMABLE EQUIPMENT CONTROLLER (PEC) IN ITS PLACE, FOR CONTROL OF ASSOCIATED ZONES. PROVIDE NEW CAT-5E NETWORK CABLE BETWEEN NEW PEC AND EXISTING VA NETWORK SWITCH. RE-USE EXISTING POWER CIRCUIT - DISCONNECT FROM EXISTING PANEL AND RECONNECT TO NEW.

21 EXISTING ANDOVER PANEL 256-S (PANEL #4) CONTROLS EXISTING TEMPERATURE ZONES. REMOVE EXISTING ANDOVER CONTROL PANEL AND PROVIDE NEW DDC PROGRAMMABLE EQUIPMENT CONTROLLER (PEC) IN ITS PLACE, FOR CONTROL OF ASSOCIATED ZONES. PROVIDE NEW CAT-5E NETWORK CABLE BETWEEN NEW PEC AND EXISTING VA NETWORK SWITCH. RE-USE EXISTING POWER CIRCUIT - DISCONNECT FROM EXISTING PANEL AND RECONNECT TO NEW.

22 EXISTING SMOKE DAMPER WITH PNEUMATIC ACTUATOR. REFER TO SHEETS MC307A & M307B FOR CONTROL.

23 EXISTING AHU SUPPLY/RETURN FAN MOTOR STARTER WITH START/STOP RELAY TO REMAIN. REFER TO SHEETS MC307A & MC307B FOR CONTROLS.

24 EXISTING HEATING HOT WATER PUMP MOTOR STARTER WITH START/STOP RELAY TO REMAIN. REFER TO SHEET MC307B FOR CONTROLS.

25 REMOVE EXISTING MANUAL TOGGLE SWITCHES MOUNTED IN DOUBLE GANG JUNCTION BOX AND REPLACE WITH ELECTRONIC RELAYS FOR AUTOMATIC START/STOP CONTROL OF EXISTING GROUND FLOOR HEATING HOT WATER PUMPS. RATING OF NEW RELAYS SHALL BE AS REQUIRED FOR COMPATIBILITY WITH 120V CONTROL CIRCUIT OF EXISTING PUMP MOTOR STARTERS. REFER TO SHEET MC307B FOR CONTROLS.

26 EXISTING ABANDONED MOTOR STARTER ASSOCIATED WITH REMOVED EXHAUST FANS 307-EF6 TO REMAIN.

27 EXISTING EXHAUST FAN 307-EF8 MOTOR STARTER AND START/STOP RELAY TO REMAIN. REFER TO SHEET MC307B FOR CONTROLS.

28 EXISTING HINGED CONTROL CABINET CONTAINING START/STOP RELAYS FOR 1ST FLOOR CEILING SPACE PROPELLER UNIT HEATERS TO REMAIN. REFER TO SHEET MC307B FOR CONTROLS.

29 EXISTING HINGED CONTROL CABINET CONTAINING START/STOP RELAYS FOR EXISTING EXHAUST FANS 307-EF1, 307-EF3 AND 307-EF5 TO REMAIN. RELAYS IN THIS CABINET ALSO PREVIOUSLY SERVED EXHAUST FANS 307-EF4, WHICH HAVE BEEN REMOVED. REFER TO SHEET MC307B FOR CONTROLS.

30 EXISTING HINGED CONTROL CABINET CONTAINING START/STOP RELAY FOR EXISTING EXHAUST FAN 307-EF7 TO REMAIN. RELAYS IN THIS CABINET ALSO PREVIOUSLY SERVED EXHAUST FANS 307-EF2 AND 307-EF9, WHICH HAVE BEEN REMOVED. REFER TO SHEET MC307A FOR CONTROLS.

31 EXISTING PROPELLER UNIT HEATER ABOVE FIRST FLOOR CEILING TO REMAIN. REFER TO SHEET MC307B FOR CONTROLS.

32 EXISTING ROOF MOUNTED EQUIPMENT TO REMAIN. REFER TO SHEETS MC307A & MC307B FOR CONTROLS.

33 REMOVE EXISTING ELECTRONIC PLENUM TEMPERATURE SENSOR ASSOCIATED WITH FIRST FLOOR CEILING PROPELLER UNIT HEATERS, AND REPLACE WITH NEW. RE-USE EXISTING WIRING. REFER TO SHEET MC307B FOR CONTROLS.

34 EXISTING WALL-MOUNTED THERMOSTAT INTEGRATED WITH LON CONTROLLER OF VAV REHEAT TERMINAL UNIT TO REMAIN.

Revisions		Date

STATE OF OHIO — GARY S. EODICE E-52755 — REGISTERED PROFESSIONAL ENGINEER

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PROJECT NO. 2013-04011 FIRM LICENSE NO. 01528

Drawing Title: BUILDING 307 FLOOR PLANS

Approved: Chief, Engineering Service

Project Title: DVAMC IMPROVE BUILDING AUTOMATION SYSTEM

Building Number: 307 | Checked: PCW | Drawn: JAC

Location: Dayton, Ohio

Date: 05/23/2014

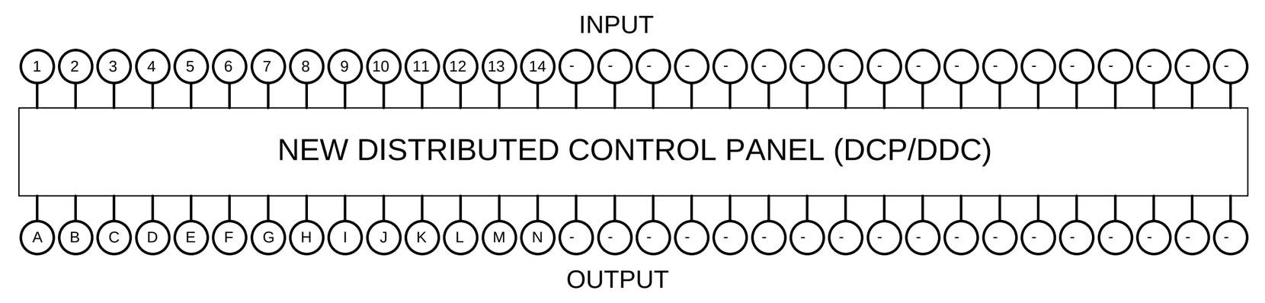
Project No.: VA Project No. 552-15-207

Drawing Number: MF307

Dwg. of

Planning & Design — Department of Veterans Affairs

PROJECT NO. 2013-04011
HEAPY ENGINEERING
DAYTON/COLUMBUS, OHIO & INDIANAPOLIS, INDIANA
MECHANICAL ELECTRICAL COMMISSIONING TECHNOLOGY
PLOTTED BY: JACoyle
PLOT/EDIT DATE: May 22, 2014



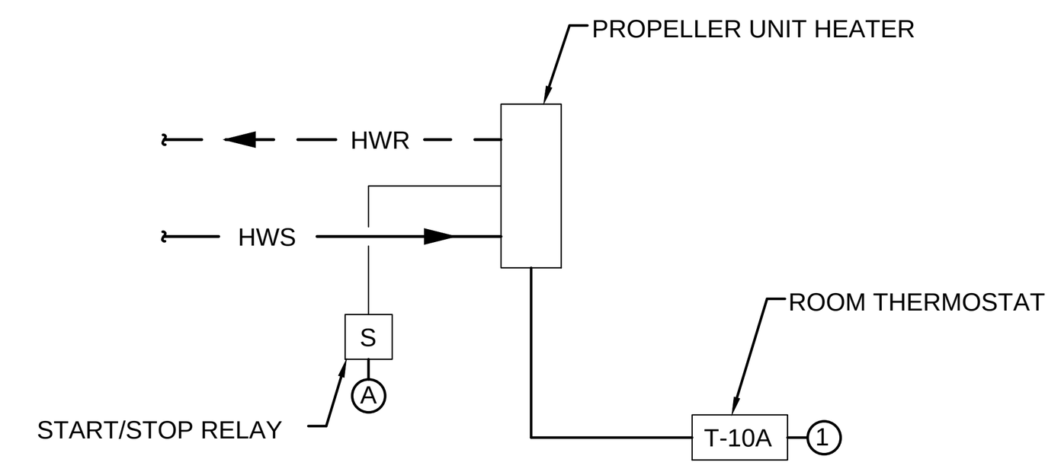
CONTROL PANEL ROOM 23A (PANEL #4)

ROOM 23A CONTROL PANEL POINTS LIST (PANEL#4)

	POINT ID	DEVICE TAG	DEVICE DESCRIPTION	DI	DO	AI	AO
(NOTE 1)	1	T-10A	ROOM 010A SPACE TEMPERATURE			X	
(NOTE 4)	2	C	EXHAUST FAN 307-EF7 STATUS CURRENT SWITCH	X			
(NOTE 1)	3	T-012	ROOM 012 SPACE TEMPERATURE			X	
(NOTE 1)	4	T-010	ROOM 010 SPACE TEMPERATURE			X	
(NOTE 1)	5	T-011	ROOM 011 SPACE TEMPERATURE			X	
(NOTE 1)	6	T-013	ROOM 013 SPACE TEMPERATURE			X	
(NOTE 1)	7	T-014	ROOM 014 SPACE TEMPERATURE			X	
(NOTE 1)	8	T-15S	ROOM 015 SOUTH SPACE TEMPERATURE			X	
(NOTE 1)	9	T-15N	ROOM 015 NORTH SPACE TEMPERATURE			X	
(NOTE 1)	10	T-CG4	CORRIDOR C-G-4 SPACE TEMPERATURE			X	
(NOTE 1)	11	T-021	ROOM 021 SPACE TEMPERATURE			X	
(NOTE 1)	12	T-022	ROOM 022 SPACE TEMPERATURE			X	
(NOTE 1)	13	T-024	ROOM 024 SPACE TEMPERATURE			X	
(NOTE 1)	14	T-CG3	CORRIDOR C-G-3 SPACE TEMPERATURE			X	
(NOTE 3)	A	S	ROOM 010A PROPELLER UNIT HEATER FAN START-STOP		X		
(NOTE 3)	B	S	GENERAL EXHAUST FAN 307-EF7 START-STOP		X		
(NOTE 2)	C	ERC	ROOM 012 ELECTRIC DUCT HEATER ENABLE		X		
(NOTE 2)	D	VV-010	ROOM 010 SPACE TEMPERATURE CONTROL				X
(NOTE 2)	E	VV-011	ROOM 011 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 2)	F	VV-013	ROOM 013 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 2)	G	VV-014	ROOM 014 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 2)	H	VV-15S	ROOM 015 SOUTH SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 2)	I	VV-15N	ROOM 015 NORTH SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 2)	J	VV-CG4	CORRIDOR C-G-4 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX)				X
(NOTE 2)	K	VV-021	ROOM 021 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX)				X
(NOTE 2)	L	VV-022	ROOM 022 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX)				X
(NOTE 2)	M	VV-024	ROOM 024 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 2)	N	VV-CG3	CORRIDOR C-G-3 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX)				X

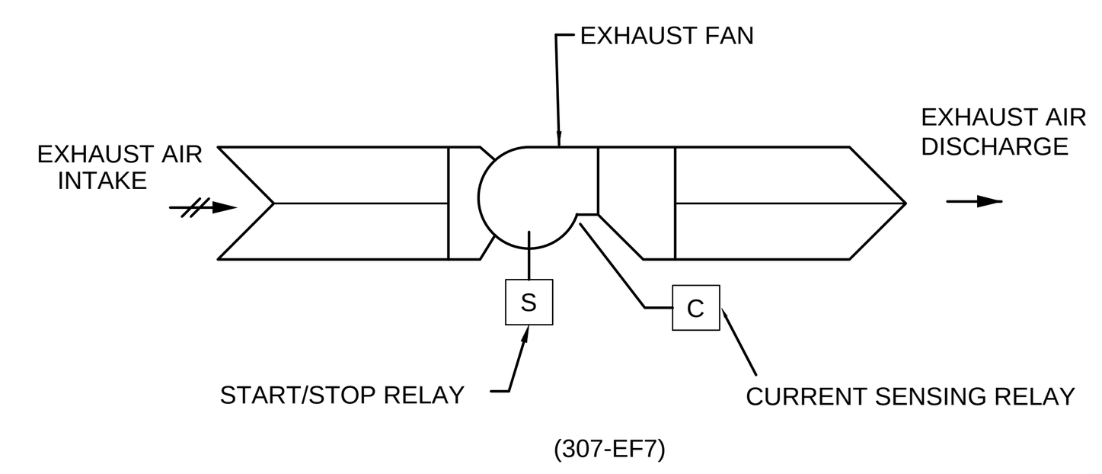
NOTES:

1. REMOVE EXISTING WALL-MOUNTED ELECTRONIC SENSOR AND REPLACE WITH NEW. REFER TO 23 09 23 FOR NEW SENSOR SPECS. RE-USE EXISTING WIRING BETWEEN SENSOR LOCATION AND NEW PANEL #4.
2. EXISTING ZONE LEVEL PNEUMATIC CONTROL DEVICE(S) TO REMAIN (VARIABLE VOLUME BOX DAMPER ACTUATORS, PRESSURE CONTACTORS FOR RADIANT PANELS AND ELECTRIC DUCT HEATER, FIN TUBE CONTROL VALVES, VARIABLE VOLUME BOX REHEAT COIL CONTROL VALVES, ETC.) PROVIDE NEW E/P TRANSDUCER WITHIN EXISTING CABINET AT EACH ROOM, TO REPLACE EXISTING TRANSDUCER. RE-USE EXISTING PNEUMATIC TUBING BETWEEN EXISTING PNEUMATIC DEVICES AND NEW E-P TRANSDUCER.
3. EXISTING ELECTRONIC RELAY TO REMAIN, SHALL BE RE-USED.
4. POINT DOES NOT CURRENTLY EXIST. PROVIDE POINT AS PART OF THIS PROJECT.



ROOM 10A PROPELLER UNIT HEATER CONTROL

DDC ROOM THERMOSTAT T-10A SHALL CONTROL FAN MOTOR. ON A DROP IN TEMPERATURE BELOW SETPOINT, THERMOSTAT T-10A SHALL START FAN THROUGH EXISTING RELAY, TO MAINTAIN ROOM TEMPERATURE SETPOINT. INITIAL SETPOINT SHALL BE 70 DEG.F (ADJ.). FAN SHALL TURN OFF ONCE ROOM THERMOSTAT INDICATES 2 DEGREES ABOVE SETPOINT (ADJ.).



EXISTING GROUND FLOOR GENERAL EXHAUST FANS

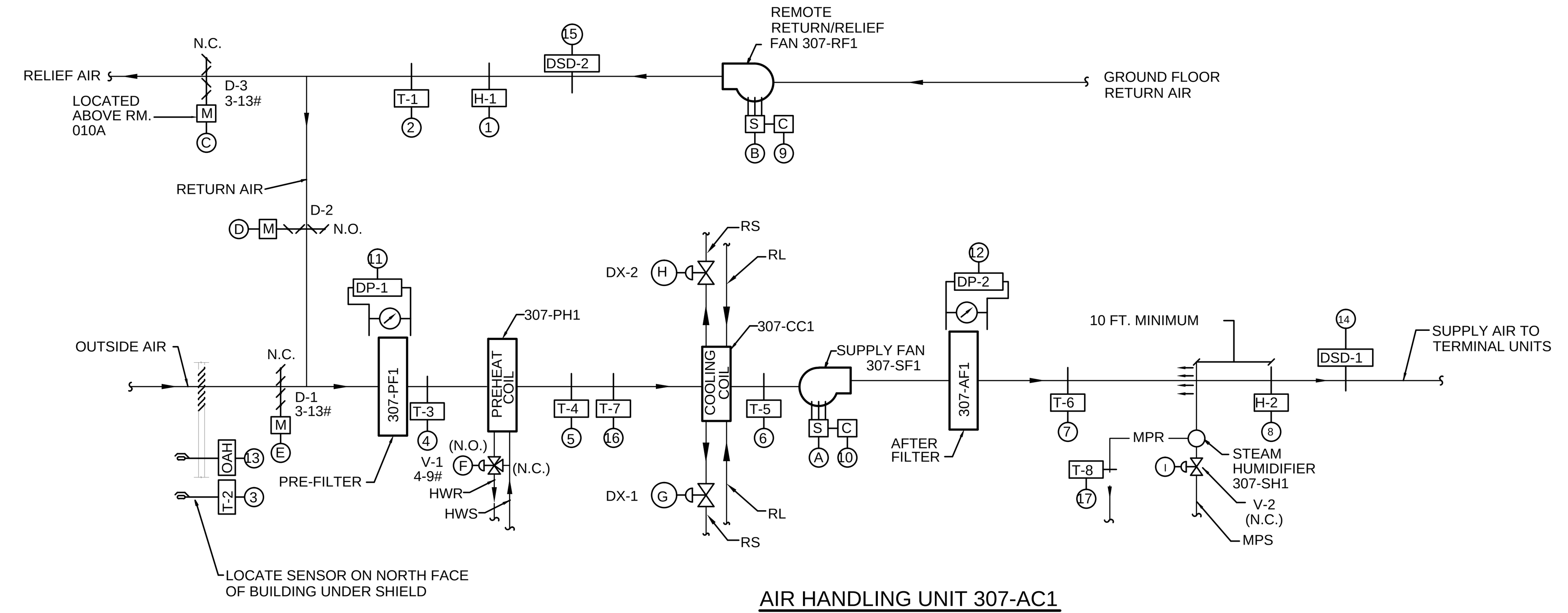
1 EXHAUST FAN CONTROLS

1.1 EXHAUST FAN SHALL BE STARTED AND STOPPED BY THE DCP OR REMOTELY AT THE ECC. FAN SHALL BE SOFTWARE INTERLOCKED TO OPERATE WITH AIR HANDLING UNIT 307-AC1, AND SHALL BE DISABLED DURING 307-AC1 UNOCCUPIED MODE.

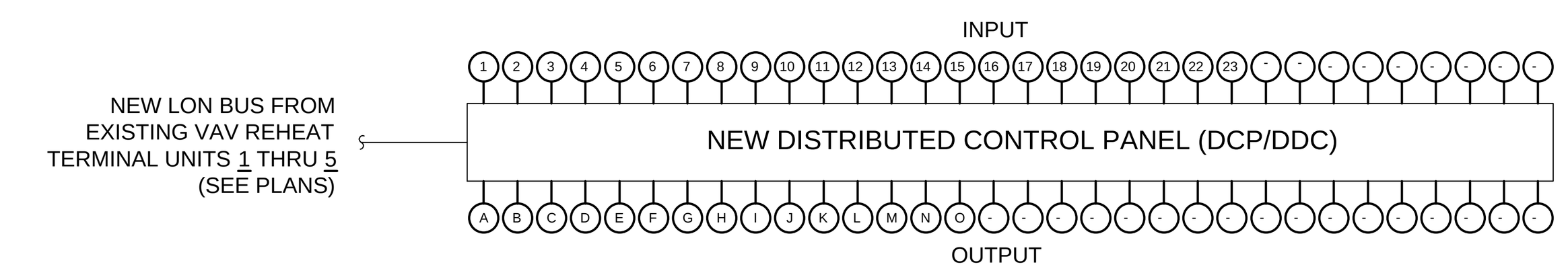
1.2 PROVIDE CURRENT SENSOR ON EXISTING FAN POWER FEEDER TO INDICATE FAN STATUS TO DCP.

DDC ROOM THERMOSTAT T-012 SHALL CONTROL ENABLE/DISABLE OF EXISTING ELECTRIC DUCT HEATER. ON A DROP IN SPACE TEMPERATURE BELOW SETPOINT, NEW CONTROLLER #4 SHALL CLOSE PRESSURE CONTACTS TO ENABLE HEATER, THROUGH NEW ZONE E-P TRANSDUCER, TO MAINTAIN ROOM TEMPERATURE SETPOINT. INITIAL SETPOINT SHALL BE 72 DEG.F (ADJ.). PRESSURE CONTACTS SHALL OPEN TO DISABLE HEATER, ONCE ROOM THERMOSTAT INDICATES 2 DEGREES ABOVE SETPOINT (ADJ.). PRESSURE CONTACTS HAVE FOLLOWING PERFORMANCE: T.R. 12#, START @ 3#.

ROOM 012 ELECTRIC DUCT HEATER CONTROL



AIR HANDLING UNIT 307-AC1



CONTROL PANEL 307-AC1 (PANEL#5)

CONTROL PANEL 307-AC1 POINTS LIST (PANEL#5)

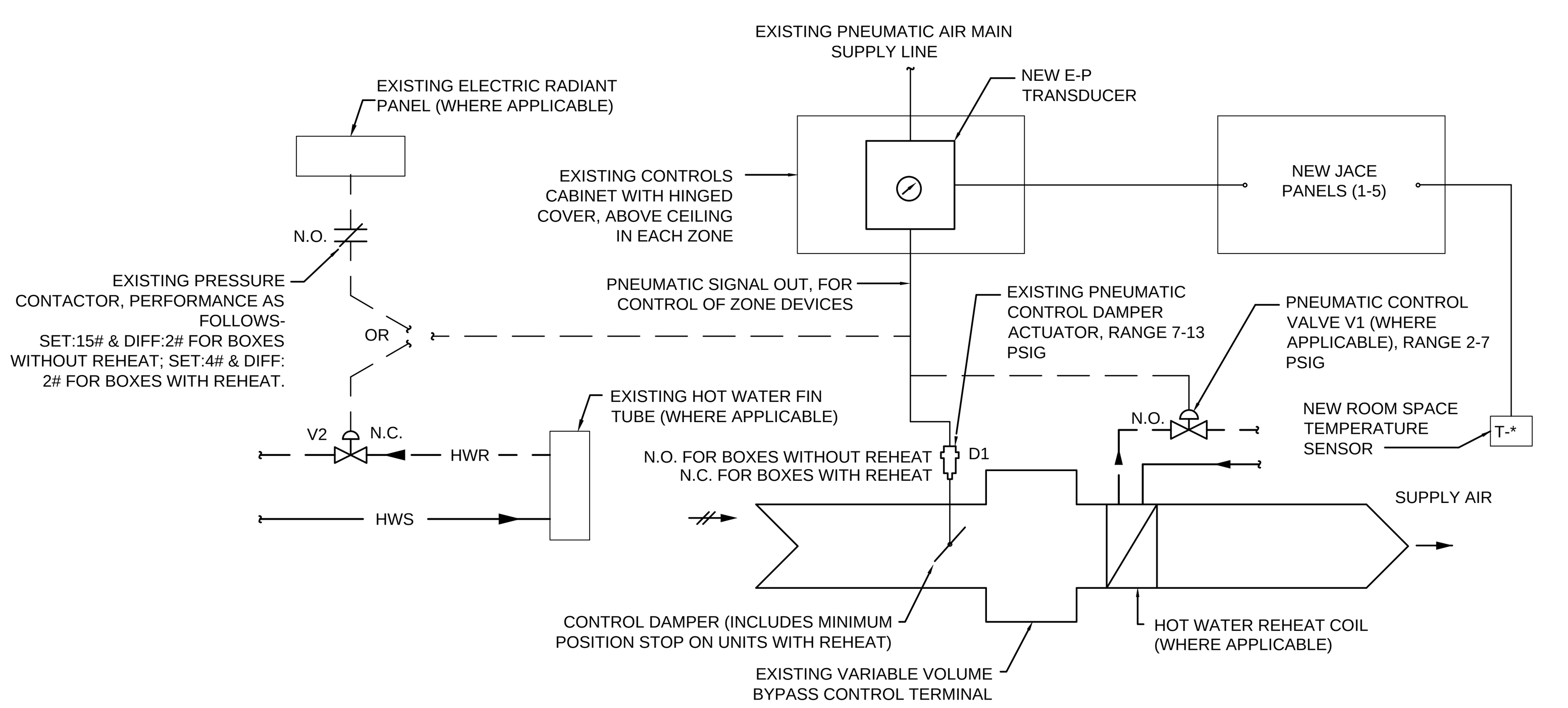
	POINT ID	DEVICE TAG	DEVICE DESCRIPTION	DI	DO	AI	AO
(NOTE 1)	1	H-1	RETURN AIR HUMIDITY SENSOR			X	
(NOTE 1)	2	T-1	RETURN AIR TEMPERATURE SENSOR			X	
(NOTE 1)	3	T-2	OUTSIDE AIR TEMPERATURE SENSOR (GLOBAL POINT)			X	
(NOTE 1)	4	T-3	MIXED AIR TEMPERATURE SENSOR			X	
(NOTE 1)	5	T-4	PREHEAT COIL LEAVING AIR TEMPERATURE SENSOR			X	
(NOTE 1)	6	T-5	COOLING COIL LEAVING AIR TEMPERATURE SENSOR			X	
(NOTE 1)	7	T-6	SUPPLY AIR TEMPERATURE SENSOR			X	
(NOTE 1)	8	H-2	SUPPLY AIR HUMIDITY SENSOR (HIGH LIMIT)	X			
(NOTE 4)	9	C	RETURN FAN STATUS CURRENT SWITCH	X			
(NOTE 4)	10	C	SUPPLY FAN STATUS CURRENT SWITCH	X			
(NOTE 1)	11	DP-1	PRE FILTER PRESSURE DROP			X	
(NOTE 1)	12	DP-2	AFTER FILTER PRESSURE DROP			X	
(NOTE 1)	13	OAH	OUTSIDE AIR HUMIDITY (GLOBAL POINT)			X	
(NOTE 6)	14	DSD-1	SUPPLY AIR DUCT SMOKE DETECTOR (FIRE SYSTEM SHUTDOWN)	X			
(NOTE 6)	15	DSD-2	RETURN AIR DUCT SMOKE DETECTOR (FIRE SYSTEM SHUTDOWN)	X			
(NOTE 6)	16	T-7	FREEZESTAT	X			
(NOTE 5)	17	T-8	HUMIDIFIER 31-SH1 STEAM JACKET CONDENSATE TEMPERATURE SENSOR	X			
(NOTE 1)	18	T-005	ROOM 005 SPACE TEMPERATURE			X	
(NOTE 1)	19	T-006	ROOM 006 SPACE TEMPERATURE			X	
(NOTE 1)	20	T-CG2	CORRIDOR C-G-2 SPACE TEMPERATURE			X	
(NOTE 1)	21	T-025	ROOM 025 SPACE TEMPERATURE			X	
(NOTE 1)	22	T-026	ROOM 026 SPACE TEMPERATURE			X	
(NOTE 1)	23	T-CG1	CORRIDOR C-G-1 SPACE TEMPERATURE			X	
(NOTE 3)	A	S	SUPPLY FAN START-STOP		X		
(NOTE 3)	B	S	RETURN FAN START-STOP		X		
(NOTE 2)	C	D-3	MODULATING RELIEF AIR DAMPER				X
(NOTE 2)	D	D-2	MODULATING RETURN AIR DAMPER				X
(NOTE 2)	E	D-1	MODULATING OUTSIDE AIR DAMPER				X
(NOTE 2)	F	V-1	MODULATING PREHEAT COIL VALVE				X
(NOTE 3)	G	DX-1	CONDENSING UNIT CU-1 DX COOLING ENABLE (FIRST STAGE OF COOLING)		X		
(NOTE 3)	H	DX-2	CONDENSING UNIT CU-1 DX COOLING ENABLE (FIRST STAGE OF COOLING)		X		
(NOTE 2)	I	V-2	MODULATING STEAM HUMIDIFIER VALVE				X
(NOTE 7)	J	VV-005	ROOM 005 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, HOT WATER FIN TUBE)				X
(NOTE 7)	K	VV-006	ROOM 006 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, HOT WATER FIN TUBE)				X
(NOTE 7)	L	VV-CG2	CORRIDOR C-G-2 SPACE TEMPERATURE CONTROL (2 VARIABLE VOLUME BOXES)				X
(NOTE 7)	M	VV-025	ROOM 025 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 7)	N	VV-026	ROOM 026 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 7)	O	VV-CG1	CORRIDOR C-G-1 SPACE TEMPERATURE CONTROL (2 VARIABLE VOLUME BOXES)				X

NOTES:

1. REMOVE EXISTING ELECTRONIC SENSOR AND REPLACE WITH NEW. REFER TO 23 09 23 FOR NEW SENSOR SPECS. RE-USE EXISTING WIRING BETWEEN SENSOR LOCATION AND ZONE E-P TRANSDUCER.
2. EXISTING SYSTEM LEVEL PNEUMATIC CONTROL DEVICE TO REMAIN. PROVIDE NEW E/P TRANSDUCER WITHIN NEW CONTROL CABINET, TO REPLACE EXISTING TRANSDUCER, AND RE-PIPE EXISTING PNEUMATIC DEVICE TO NEW E/P TRANSDUCER.
3. EXISTING ELECTRONIC RELAY TO REMAIN, SHALL BE RE-USED.
4. REMOVE EXISTING DIFFERENTIAL PRESSURE FAN STATUS SWITCH AND REPLACE WITH CURRENT SWITCH ON POWER FEEDER TO FAN MOTOR, FOR FAN STATUS INDICATION. SEAL EXISTING DUCT OPENINGS.
5. POINT DOES NOT CURRENTLY EXIST. PROVIDE POINT AS PART OF THIS PROJECT.
6. EXISTING ELECTRONIC SENSOR TO REMAIN, SHALL BE RE-USED.
7. EXISTING ZONE LEVEL PNEUMATIC CONTROL DEVICE(S) TO REMAIN (VARIABLE VOLUME BOX DAMPER ACTUATORS, PRESSURE CONTACTORS FOR RADIANT PANELS AND ELECTRIC DUCT HEATER, FIN TUBE CONTROL VALVES, VARIABLE VOLUME BOX REHEAT COIL CONTROL VALVES, ETC.) PROVIDE NEW E/P TRANSDUCER WITHIN EXISTING CABINET AT EACH ROOM, TO REPLACE EXISTING TRANSDUCER. RE-USE EXISTING PNEUMATIC TUBING BETWEEN EXISTING PNEUMATIC DEVICES AND NEW E-P TRANSDUCER, AND RE-USE WIRING BETWEEN NEW CONTROL PANEL AND ZONE E-P TRANSDUCER.

LEGEND (APPLIES TO AIR HANDLING UNIT 307-AC1)

C	CURRENT SENSING RELAY	TRANSMITS MOTOR CURRENT TO DCP TO INDICATE STATUS OF FANS.
DP-1 DP-2	DIFFERENTIAL PRESSURE SENSOR	TRANSMITS DIFFERENTIAL PRESSURE TO DCP TO INDICATE FILTER CONDITION
DCP	DIRECT DIGITAL CONTROL PANEL	CONTROLS OPERATION OF AIR HANDLING UNIT IN ACCORDANCE WITH THE SEQUENCE OF OPERATION
D-1	MODULATING OUTSIDE AIR DAMPER	PROPORTIONS FLOW OF OUTSIDE AIR IN RESPONSE TO DCP AND CLOSES WHEN SUPPLY FAN STOPS
D-2	MODULATING RETURN AIR DAMPER	PROPORTIONS FLOW OF RETURN AIR IN RESPONSE TO DCP AND OPENS WHEN SUPPLY FAN STOPS
D-3	MODULATING RELIEF AIR DAMPER	PROPORTIONS FLOW OF RELIEF AIR IN RESPONSE TO DCP AND CLOSES WHEN SUPPLY FAN STOPS
DSD	DUCT SMOKE DETECTORS	PROVIDE SMOKE SIGNAL TO DCP
DX-1 DX-2	DX CONDENSING UNIT START/ STOP RELAY	ENABLES/DISABLES STAGES OF DX COOLING IN RESPONSE TO DCP
ECC	ENGINEERING CONTROL CENTER	LOCATED IN BUILDING 310 MEZZANINE FOR MONITORING OF SYSTEM OPERATIONS
ERC	ELECTRIC DUCT HEATER START/ STOP RELAY	ENABLES/DISABLES ROOM 012 ELECTRIC DUCT HEATER IN RESPONSE TO DCP
H-1	RETURN AIR HUMIDITY SENSOR	SENSES AND TRANSMITS RETURN AIR HUMIDITY TO DCP FOR CONTROL AND INDICATION
H-2	SUPPLY AIR HUMIDITY SENSOR	SENSES AND TRANSMITS SUPPLY AIR HUMIDITY TO DCP FOR CONTROL AND INDICATION
OAH	OUTSIDE AIR HUMIDITY SENSOR	SENSES AND TRANSMITS OUTSIDE AIR HUMIDITY TO DCP FOR ENTHALPY CALCULATION
S	FAN START/STOP RELAYS	ENABLES/DISABLES SUPPLY, RETURN, EXHAUST, AND UNIT HEATER FANS IN RESPONSE TO DCP
T-1	RETURN AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS RETURN AIR DRY BULB TEMPERATURE TO DCP FOR INDICATION ONLY
T-2	OUTSIDE AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS OUTSIDE AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-3	MIXED AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS MIXED AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-4	PREHEAT COIL LEAVING AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS PREHEAT AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-5	COOLING COIL LEAVING AIR TEMPERTURE	SENSES AND TRANSMITS COOLING COIL DISCHARGE AIR TEMPERATURE TO DCP FOR INDICATION ONLY
T-6	SUPPLY AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS SUPPLY AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-7	FREEZESTAT	SHUTS DOWN SUPPLY FAN UPON SENSING FREEZE CONDITION.
T-8	307-SH1 JACKET CONDENSATE TEMPERATURE SENSOR	SENSES AND TRANSMITS 307-SH1 JACKET CONDENSATE TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-###	MISCELLANEOUS ZONE CONTROL SPACE TEMPERATURE SENSOR	SENSES AND TRANSMITS ZONE SPACE TEMPERATURE TO DCP FOR CONTROL AND INDICATION
V-1	MODULATING HOT WATER CONTROL VALVE	PROPORTIONS FLOW OF HOT WATER TO PREHEAT COIL IN RESPONSE TO DCP
V-2	MODULATING STEAM CONTROL VALVE	PROPORTIONS FLOW OF STEAM TO HUMIDIFIER IN RESPONSE TO DCP
VV-###	ZONE SPACE TEMPERATURE CONTROL SIGNAL	SENDS ANALOG OUTPUT SIGNAL TO ZONE E-P TRANSDUCERS IN RESPONSE TO DCP, TO MODULATE ZONE TEMPERATURE CONTROL DEVICES.



TYPICAL ZONE TEMPERATURE CONTROL

ZONE TEMPERATURE CONTROL SEQUENCES

NEW ZONE TEMPERATURE THERMOSTAT SHALL TRANSMIT SPACE TEMPERATURE TO NEW JACE CONTROLLERS 1 THRU 5, AS INDICATED IN POINTS LISTS.

WHEN ROOM TEMPERATURE AT T-* IS BELOW SETPOINT, THE NEW CONTROLLER (#1-#5) SHALL SEND ANALOG SIGNAL TO NEW ZONE E-P TRANSDUCER, TO:

1. MODULATE DAMPER D1 TO BYPASS EXCESS SUPPLY AIRFLOW INTO CEILING PLENUM, UNTIL BOX ROOM SUPPLY AIRFLOW IS REDUCED TO THE MINIMUM SETTING.
2. ONCE BOX AIRFLOW IS AT MINIMUM, CLOSE ELECTRIC RADIANT PANEL CONTACT (WHERE APPLICABLE).
3. MODULATE HOT WATER REHEAT CONTROL VALVE V1 OPEN (WHERE APPLICABLE).
4. MODULATE HOT WATER FIN TUBE CONTROL VALVE V2 OPEN (WHERE APPLICABLE).

THE REVERSE SHALL OCCUR ON A RISE IN SPACE TEMPERATURE ABOVE SETPOINT.

INITIAL ROOM SPACE TEMPERATURE SET POINT SHALL BE 72 DEG. F, AND SHALL BE ADJUSTABLE FROM THE FRONT END COMPUTER INTERFACE. COORDINATE AND ADJUST OCCUPANCY SCHEDULES AND TEMPERATURE RANGE WITH COR.

DURING UNOCCUPIED MODE OF AIR HANDLING UNITS 307-AC1 AND 307-AC2, ZONE TEMPERATURE SETPOINT SHALL BE RESET THROUGH THE ASSOCIATED CONTROLLER (#1-#5) TO 65 DEG. F (ADJ.).

EXISTING VAV REHEAT TERMINAL UNITS 1 THRU 4 WITH LON APPLICATION SPECIFIC CONTROLLERS, SERVE PROSTHETICS DEPARTMENT ON GROUND FLOOR. EXISTING CONTROLS SHALL REMAIN, AND ALL CONTROL SETPOINTS AND PARAMETERS SHALL BE AVAILABLE AT ECC, THROUGH LON INTEGRATION TO NEW PANEL #5.

REFER TO POINTS LISTS ON SHEET MC307B FOR ZONE CONTROL POINTS ASSOCIATED WITH NEW CONTROL PANELS 1 AND 2. REFER TO POINTS LIST ON SHEET MC307C FOR ZONE CONTROL POINTS ASSOCIATED WITH NEW CONTROL PANEL #3.

GENERAL NOTES

1. A COMPLETE SYSTEM OF AUTOMATIC TEMPERATURE CONTROLS SHALL BE INSTALLED UNDER THIS CONTRACT AS REQUIRED TO ACCOMPLISH THE SEQUENCE OF CONTROL FOR VARIOUS ITEMS OF EQUIPMENT AND SYSTEMS AS DESCRIBED HEREINAFTER. THE SYSTEM SHALL BE A DIRECT DIGITAL CONTROL SYSTEM UTILIZING PNEUMATIC ACTUATION.
2. ALL CONTROL POWER SOURCES REQUIRED SHALL BE PROVIDED UNDER THE ATC WORK. THIS WORK SHALL INCLUDE BUT NOT BE LIMITED TO WIRING, CONDUIT, TRANSFORMERS, RELAYS AND FUSES.
3. POINTS LIST IS SHOWN AS AN AID TO THE CONTRACTOR INDICATING THE MINIMUM POINTS REQUIRED FOR CONTROL AND MONITORING. ALL INPUT AND OUTPUT POINTS, AND THEIR REQUIRED INTERFACE AND ACCESSORY HARDWARE, SHALL BE PROVIDED FOR A COMPLETE AND FUNCTIONAL CONTROL SYSTEM. IF OR WHEN ADDITIONAL POINTS ARE REQUIRED TO ACCOMPLISH THE SEQUENCES OF CONTROL SPECIFIED, THESE POINTS, ALONG WITH ADDITIONAL DIRECT DIGITAL CONTROL PANEL(S) (IF REQUIRED), SHALL ALSO BE PROVIDED.

SEQUENCE OF OPERATION FOR 307-AC1

1. GENERAL

1.1 UNIT IS NORMALLY STARTED AND STOPPED BY THE DCP OR REMOTELY AT THE ECC. H-O-A SWITCH SHALL BE KEPT IN THE "AUTO" POSITION. "HAND" AND "OFF" POSITIONS SHALL BE USED ONLY FOR MAINTENANCE.

1.2 WHEN THE UNIT IS "OFF", FOR ANY REASON, OUTSIDE AIR DAMPER D-1 AND RELIEF AIR DAMPER D-3 SHALL BE FULLY CLOSED, RETURN AIR DAMPER D-2 SHALL BE FULLY OPEN, AND SUPPLY AND RETURN FANS SHALL BE OFF.

1.3 WHEN THE UNIT IS "ON", SUPPLY AND RETURN FANS SHALL START, AND D-1, D-2 AND D-3 SHALL MODULATE IN ACCORDANCE WITH THE FOLLOWING SEQUENCE.

2. TEMPERATURE CONTROL

2.1 SUPPLY AIR TEMPERATURE, SENSED BY T-6, SHALL BE MAINTAINED AT SETPOINT OF 54.5 DEG. F. (ADJ.) VIA DCP BY ENABLING STAGES OF DX COOLING (307-CU1), OR MODULATING ECONOMIZER DAMPERS D-1, D-2 AND D-3 OR PREHEAT COIL VALVE V-1, IN SEQUENCE. SEPARATE CONTROL LOOPS SHALL BE UTILIZED FOR ECONOMIZER COOLING, MECHANICAL COOLING, AND HEATING FUNCTION. DX COOLING SHALL BE DISABLED BEFORE PREHEAT COIL VALVE V-1 OPENS, AND VICE VERSA.

3. ENTHALPY ECONOMIZER CONTROL

3.1 OUTSIDE AIR TEMPERATURE AND HUMIDITY, AND RETURN AIR TEMPERATURE AND HUMIDITY SHALL BE MEASURED, AND THE ENTHALPY OF EACH DETERMINED. IF THE ENTHALPY OF THE OUTSIDE AIR IS LESS THAN THE ENTHALPY OF THE RETURN AIR, THE ECONOMIZER SHALL BE ENABLED. WHEN THE OUTSIDE AIR ENTHALPY IS HIGHER THAN THE RETURN AIR ENTHALPY AND MECHANICAL COOLING IS AVAILABLE, THE ECONOMIZER SHALL BE DISABLED.

4. ECONOMIZER CYCLE

4.1 WHEN THE UNIT OPERATES IN THE OCCUPIED MODE, MINIMUM OUTSIDE AIR SHALL BE PROVIDED BY OPENING OUTSIDE AIR DAMPERS D-1, RETURN AIR DAMPERS D-2, AND RELIEF AIR DAMPERS D-3 TO A POSITION DETERMINED BY AIRFLOW READINGS, TO SUPPLY MINIMUM OUTSIDE AIR VOLUME. THIS CONDITION IS THE NORMAL POSITION AND SHALL BE MAINTAINED DURING THE OCCUPIED MODE EXCEPT DURING THE "ECONOMIZER" CYCLE. DURING THE "ECONOMIZER" CYCLE, THE AMOUNT OF OUTSIDE AIR AND RELIEF AIR SHALL BE INCREASED AS REQUIRED TO MAINTAIN THE UNIT DISCHARGE AIR TEMPERATURE SETPOINT, AS SENSED BY T-6. PROVIDE A MIXED AIR SENSOR AND LOW LIMIT CONTROL (T-3) SET AT 50 DEGREES F. TO PREVENT OVER-OPENING OF THE ECONOMIZER OUTSIDE AIR DAMPERS. ALL CONTROL SETPOINTS SHALL BE FULLY ADJUSTABLE TO MEET JOB CONDITIONS. MINIMUM OUTSIDE AIR VOLUME SHALL BE 15% OF SUPPLY AIR VOLUME. SUPPLY AND RETURN AIRFLOW SHALL BE MEASURED PRIOR TO STARTING THIS WORK, AND SHALL BE NOTED ON AS-BUILT CONTROL DRAWINGS, ALONG WITH MINIMUM OUTSIDE AIR VOLUME.

5. AIR FLOW CONTROL

5.1 EXISTING SUPPLY AND RETURN FAN MOTOR STARTERS SHALL RESPOND TO START/STOP COMMANDS AND ALL SAFETIES (FREEZE, SMOKE, ETC.) WHETHER IN THE HAND OR AUTOMATIC MODE.

6. HUMIDITY CONTROL

6.1 WHEN THE DCP IS NOT CALLING FOR HUMIDITY, SENSED BY RETURN AIR HUMIDITY SENSOR H-1, MODULATING HUMIDIFIER CONTROL VALVE V-2 SHALL REMAIN CLOSED. DCP SHALL ALSO CLOSE VALVE V-2 WHENEVER THE OUTSIDE AIR TEMPERATURE IS ABOVE 55 DEG. F, OR WHENEVER THE SUPPLY FAN IS OFF.

6.2 RETURN AIR HUMIDITY, SENSED BY H-1, SHALL BE MAINTAINED AT SETPOINT (30% RH, ADJUSTABLE) VIA DCP BY MODULATING HUMIDIFIER CONTROL VALVE V-2 TO MAINTAIN THE DESIRED HUMIDITY. THE DCP SHALL OVERRIDE THIS CONTROL TO MAINTAIN A MAXIMUM HUMIDITY LEVEL OF 80% AS SENSED BY H-2. VALVE V-2 SHALL BE INTERLOCKED WITH JACKET CONDENSATE TEMPERATURE SWITCH T-8, TO KEEP THE HUMIDIFIER OFF UNTIL JACKET CONDENSATE TEMPERATURE APPROACHES STEAM TEMPERATURE.

7. FREEZE PROTECTION

7.1 IF THE PREHEAT COIL DISCHARGE AIR TEMPERATURE AS SENSED BY T-4 FALLS BELOW 40 DEG.F, AN ALARM SIGNAL SHALL INDICATE AT THE DCP AND ECC. IF THE PREHEAT COIL DISCHARGE TEMPERATURE FALLS BELOW 35 DEG.F AS SENSED BY FREEZESTAT T-7, THE SUPPLY AND RETURN FANS SHALL SHUT DOWN AND A CRITICAL ALARM SHALL INDICATE AT THE DCP AND ECC. T-7 SHALL BE HARDWIRED TO THE SUPPLY FAN SAFETY CIRCUIT TO SHUT DOWN THE UNIT IN THE HAND OR AUTOMATIC MODE. T-7 SHALL REQUIRE MANUAL RESET AT THE DEVICE.

8. AUTOMATIC SHUTDOWN / RESTART

8.1 WHEN SMOKE IS DETECTED BY EITHER THE SUPPLY OR RETURN DUCT SMOKE DETECTOR, THE SUPPLY AND RETURN AIR FANS AND INTERLOCKED EXHAUST FAN 307-EF7 SHALL SHUT "OFF", REMOTE GROUND FLOOR SMOKE DAMPERS SHALL CLOSE, AND A SUPERVISORY SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SYSTEM, AND A SUPERVISORY SIGNAL SHALL INDICATE AT THE DCP AND ECC. SUPPLY AND RETURN FANS AND INTERLOCKED EXHAUST FANS SHALL RESTART AND SMOKE DAMPERS SHALL OPEN WHEN WHEN THE FIRE ALARM CIRCUIT IS RESET. REFER TO FLOOR PLANS FOR LOCATION OF EXISTING REMOTE SMOKE DAMPERS.

9. DISCHARGE AIR RESET

9.1 THE AIR HANDLING UNIT CONTROLS SHALL PROVIDE DISCHARGE AIR TEMPERATURE CONTROL BASED ON ZONE DEMAND DEVIATION FROM SETPOINT. ALL ZONES SHALL BE SAMPLED AND THE ZONE FURTHEST FROM SETPOINT SHALL GOVERN. AS THE DEVIATION FROM SETPOINT DECREASES, THE DISCHARGE AIR SHALL BE RESET. 54.5 DEG. F AND 62 DEG. F SHALL BE THE LOW AND HIGH RESET LIMITS, RESPECTIVELY. ALL CONTROL SETPOINTS (INCLUDING HIGH AND LOW SET POINTS FOR DISCHARGE AIR TEMPERATURE) SHALL BE FULLY ADJUSTABLE TO MEET JOB CONDITIONS.

10. EXCESS FLOW BYPASS

10.1 EXISTING VAV TERMINAL UNIT 5, WITH LON CONTROLLER, IS INSTALLED IN BYPASS DUCT BETWEEN 307-AC1 SUPPLY AND RETURN MAINS, ABOVE ROOM 039, AND SERVES AS SYSTEM BYPASS DAMPER. BOX 5 OPERATES IN CONJUNCTION WITH ADJACENT SUPPLY DUCT PRESSURE SENSOR, TO BYPASS FLOW FROM SUPPLY MAIN TO RETURN MAIN, UPON RISE IN SUPPLY DUCT MAIN PRESSURE ABOVE SETPOINT. EXISTING SYSTEM BYPASS CONTROL THROUGH BOX 5 SHALL REMAIN, AND BYPASS CONTROL SETPOINTS AND PARAMETERS SHALL BE AVAILABLE AT ECC, THROUGH LON INTEGRATION TO NEW PANEL #5.

11. FILTER CONDITION MONITORING

11.1 NEW FILTER DIFFERENTIAL PRESSURE SENSORS DP-1 AND DP-2 SHALL INDICATE PRESSURE DIFFERENTIAL ACROSS FILTER BANKS AT ALL TIMES. WHEN PRESSURE RISES ABOVE VA'S RECOMMENDED CHANGEOVER PRESSURE DROP (0.66" FOR PREFILTERS, 0.68" FOR AFTER FILTERS), AN ALARM SHALL INDICATE AT THE DCP AND ECC. ALL SETPOINTS SHALL BE ADJUSTABLE.

12. UNOCCUPIED MODE

12.1 307-AC1 AND INTERLOCKED EXHAUST FANS SHALL BE ABLE TO BE SCHEDULED FOR OCCUPIED/UNOCCUPIED 7-DAY AND HOLIDAY OPERATION. PROVIDE START/STOP SOFTWARE INTERLOCK BETWEEN UNIT SUPPLY & RETURN FANS AND REMOTE EXHAUST FAN 307-EF7. DURING THE OCCUPIED MODE, THE TEMPERATURE CONTROLS SHALL FUNCTION AS SPECIFIED. DURING UNOCCUPIED MODE, THE AIR HANDLING UNIT AND INTERLOCKED REMOTE EXHAUST FANS SHALL REMAIN OFF. INITIAL SCHEDULE - UNIT SHALL OPERATE 7 DAYS A WEEK, 7:00 AM TO 5:00 PM. UNIT SHALL BE OFF AFTER SCHEDULED HOURS. COORDINATE EXACT SCHEDULE WITH COR.
UNIT SHALL INCLUDE MORNING WARM-UP AND COOL DOWN PROGRAMS, WITH OPTIMAL START. REFER TO 23 09 23 FOR MORE DETAILS ON THIS CONTROL.

Revisions | Date

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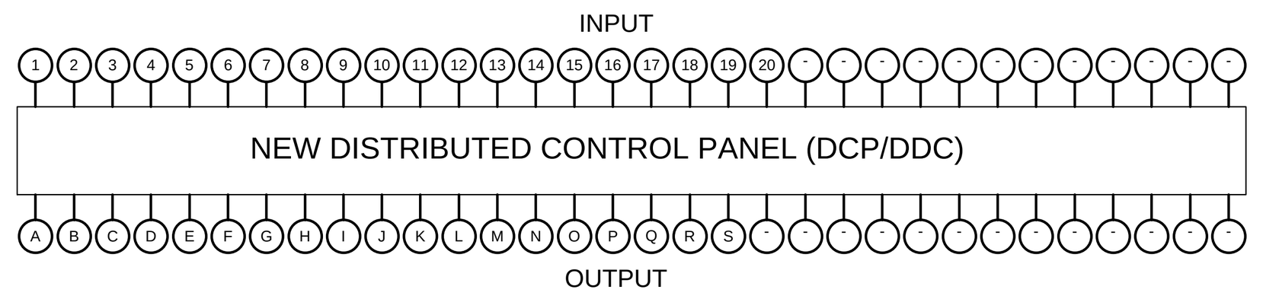
Drawing Title: BUILDING 307 CONTROLS AND AUTOMATION
Approved: Chief, Engineering Service
Project Title: DVAMC IMPROVE BUILDING AUTOMATION SYSTEM
Building Number: 307 Checked: PCW Drawn: JAC
Location: Dayton, Ohio
Date: 05/23/2014
Project No.: VA Project No. 552-15-207
Drawing Number: MC307A
Dwg. of
Planning & Design
Department of Veterans Affairs

PROJECT NO. 2013-04011 HEAPY ENGINEERING DAYTON/COLUMBUS, OHIO & INDIANAPOLIS, INDIANA MECHANICAL ELECTRICAL COMMISSIONING TECHNOLOGY PLOTTED BY: JACoyle PLOT/EDIT DATE: May 22, 2014



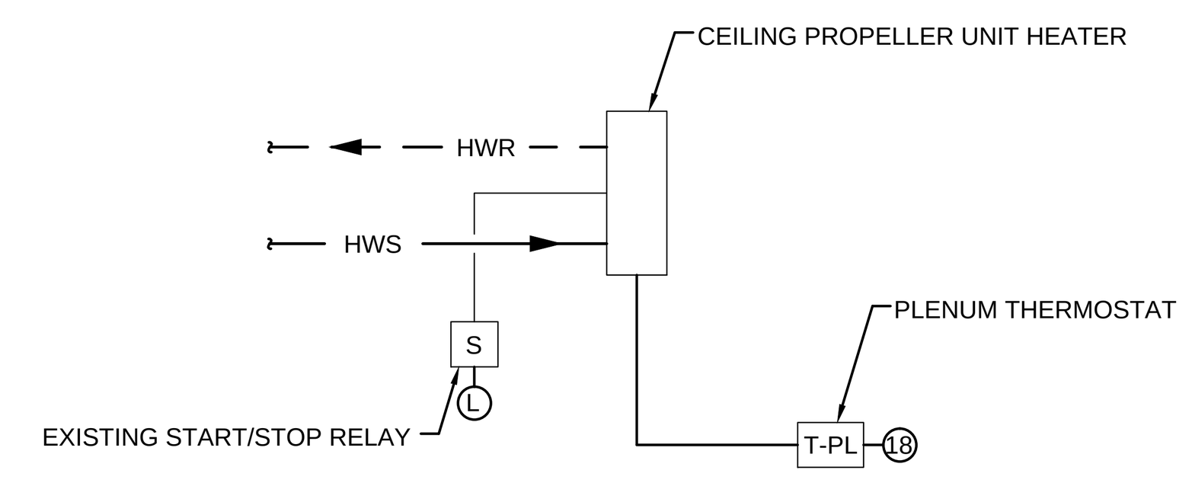
FIRST FLOOR MECHANICAL ROOM CONTROL PANEL (PANEL #2)

ROOM 107 HYDRONIC CONTROL PANEL POINTS LIST (PANEL#2)

	POINT ID	DEVICE TAG	DEVICE DESCRIPTION	DI	DO	AI	AO
(NOTE 1)	1	T-9	HEATING HOT WATER SYSTEM SUPPLY TEMPERATURE			X	
(NOTE 1)	2	T-10	HEATING HOT WATER SYSTEM RETURN TEMPERATURE			X	
(NOTE 4)	3	C	FIRST FLOOR HEATING HOT WATER SYSTEM PUMP #1 (307-P1) STATUS CURRENT SWITCH	X			
(NOTE 4)	4	C	FIRST FLOOR HEATING HOT WATER SYSTEM PUMP #2 (307-P2) STATUS CURRENT SWITCH	X			
(NOTE 6)	5	C	GROUND FLOOR HEATING HOT WATER SYSTEM PUMP #1 (307-P3) STATUS CURRENT SWITCH	X			
(NOTE 6)	6	C	GROUND FLOOR HEATING HOT WATER SYSTEM PUMP #2 (307-P4) STATUS CURRENT SWITCH	X			
(NOTE 1)	7	T-105	ROOM 105 SPACE TEMPERATURE			X	
(NOTE 1)	8	T-106	ROOM 106 SPACE TEMPERATURE			X	
(NOTE 1)	9	T-108	ROOM 108 SPACE TEMPERATURE			X	
(NOTE 1)	10	T-109	ROOM 109 SPACE TEMPERATURE			X	
(NOTE 1)	11	T-110	ROOM 110 SPACE TEMPERATURE			X	
(NOTE 1)	12	T-111	ROOM 111 SPACE TEMPERATURE			X	
(NOTE 1)	13	T-121	ROOM 121 SPACE TEMPERATURE			X	
(NOTE 1)	14	T-125	ROOM 125 SPACE TEMPERATURE			X	
(NOTE 1)	15	T-126	ROOM 126 SPACE TEMPERATURE			X	
(NOTE 1)	16	T-C12	CORRIDOR C-1-2 SPACE TEMPERATURE			X	
(NOTE 1)	17	T-C13	CORRIDOR C-1-3 SPACE TEMPERATURE			X	
(NOTE 1)	18	T-134	ROOM 134 SPACE TEMPERATURE			X	
(NOTE 1)	19	T-C11	CORRIDOR C-1-1 SPACE TEMPERATURE			X	
(NOTE 1)	20	T-122	ROOM 122 SPACE TEMPERATURE			X	
(NOTE 5)	A	V-3	CONVERTER 307-C1 STEAM CONTROL VALVE				X
(NOTE 3)	B	S	FIRST FLOOR HEATING HOT WATER SYSTEM PUMP #1 (307-P1) START-STOP		X		
(NOTE 3)	C	S	FIRST FLOOR HEATING HOT WATER SYSTEM PUMP #2 (307-P2) START-STOP		X		
(NOTE 6)	D	S	GROUND FLOOR HEATING HOT WATER SYSTEM PUMP #1 (307-P3) START-STOP		X		
(NOTE 6)	E	S	GROUND FLOOR HEATING HOT WATER SYSTEM PUMP #2 (307-P4) START-STOP		X		
(NOTE 2)	F	VV-105	ROOM 105 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME REHEAT BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 2)	G	VV-106	ROOM 106 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME REHEAT BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 2)	H	VV-108	ROOM 108 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX)				X
(NOTE 2)	I	VV-109	ROOM 109 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME REHEAT BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 2)	J	VV-110	ROOM 110 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, HOT WATER FIN TUBE)				X
(NOTE 2)	K	VV-111	ROOM 111 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, HOT WATER FIN TUBE)				X
(NOTE 2)	L	VV-121	ROOM 121 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, HOT WATER FIN TUBE)				X
(NOTE 2)	M	VV-125	ROOM 125 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME REHEAT BOX)				X
(NOTE 2)	N	VV-126	ROOM 126 SOUTH SPACE TEMPERATURE CONTROL (2 VARIABLE VOLUME REHEAT BOXES)				X
(NOTE 2)	O	VV-C12	CORRIDOR C-1-2 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX)				X
(NOTE 2)	P	VV-C13	CORRIDOR C-1-3 SPACE TEMPERATURE CONTROL (2 VARIABLE VOLUME BOXES)				X
(NOTE 2)	Q	VV-134	ROOM 134 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX)				X
(NOTE 2)	R	VV-C11	CORRIDOR C-1-1 SPACE TEMPERATURE CONTROL (3 VARIABLE VOLUME BOXES)				X
(NOTE 2)	S	VV-122	ROOM 122 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, ELECTRIC RADIANT PANELS)				X

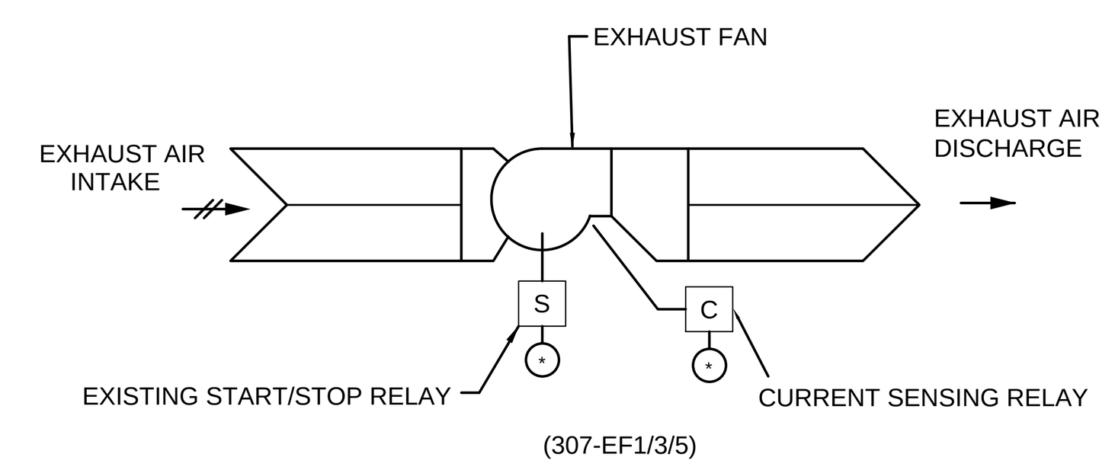
NOTES:

1. REMOVE EXISTING ELECTRONIC SENSOR AND REPLACE WITH NEW. REFER TO 23 09 23 FOR NEW SENSOR SPECS. RE-USE EXISTING WIRING BETWEEN SENSOR LOCATION AND ZONE E-P TRANSDUCER.
2. EXISTING ZONE LEVEL PNEUMATIC CONTROL DEVICE(S) TO REMAIN (VARIABLE VOLUME BOX DAMPER ACTUATORS, PRESSURE CONTACTORS FOR RADIANT PANELS AND ELECTRIC DUCT HEATER, FIN TUBE CONTROL VALVES, VARIABLE VOLUME BOX REHEAT COIL CONTROL VALVES, ETC.) PROVIDE NEW E/P TRANSDUCER WITHIN EXISTING CABINET AT EACH ROOM, TO REPLACE EXISTING TRANSDUCER. RE-USE EXISTING PNEUMATIC TUBING BETWEEN EXISTING PNEUMATIC DEVICES AND NEW E-P TRANSDUCER, AND RE-USE WIRING BETWEEN NEW CONTROL PANEL AND ZONE E-P TRANSDUCER.
3. EXISTING ELECTRONIC RELAY TO REMAIN, SHALL BE RE-USED.
4. REMOVE EXISTING PIPE-MOUNTED FLOW SWITCH AND REPLACE WITH CURRENT SWITCH ON POWER FEEDER TO PUMP MOTORS, FOR PUMP STATUS INDICATION. CAP EXISTING PIPE SENSOR OPENING.
5. EXISTING SYSTEM LEVEL PNEUMATIC CONTROL DEVICE TO REMAIN. PROVIDE NEW E/P TRANSDUCER WITHIN NEW CONTROL CABINET, TO REPLACE EXISTING TRANSDUCER, AND RE-PIPE EXISTING PNEUMATIC DEVICE TO NEW E/P TRANSDUCER.
6. POINT DOES NOT CURRENTLY EXIST. PROVIDE POINT AS PART OF THIS PROJECT.



1ST FLOOR CEILING PROPELLER UNIT HEATER CONTROL

DDC PLENUM THERMOSTAT T-PL SHALL CONTROL FAN MOTORS. ON A DROP IN CEILING PLENUM TEMPERATURE BELOW SETPOINT, THERMOSTAT T-PL SHALL START FANS THROUGH EXISTING RELAY, TO MAINTAIN PLENUM TEMPERATURE SETPOINT. INITIAL SETPOINT SHALL BE 68 DEG.F (ADJ.). FAN SHALL TURN OFF ONCE PLENUM THERMOSTAT INDICATES 2 DEGREES ABOVE SETPOINT.



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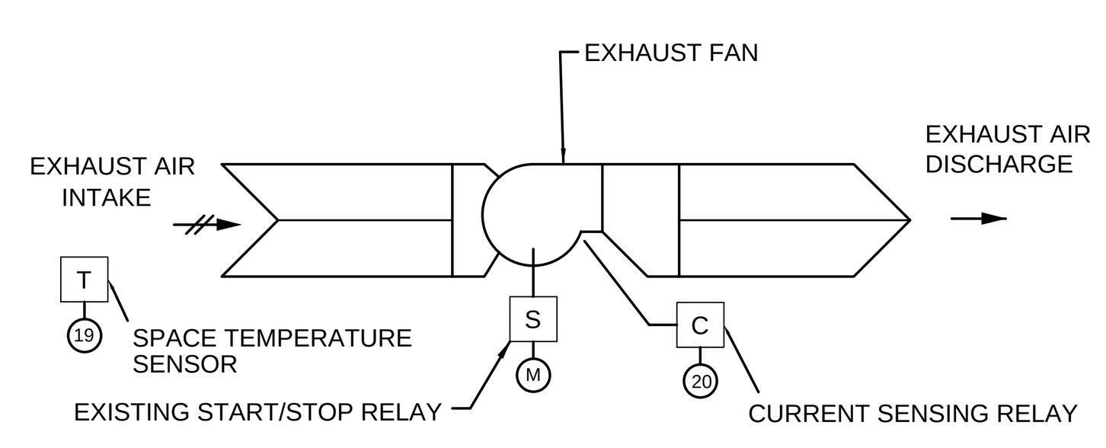
FIRST FLOOR GENERAL EXHAUST FANS

EXHAUST FAN CONTROLS

1.1 FIRST FLOOR EXHAUST FANS 307-EF1, 307-EF3 & 307-EF5: EXHAUST FANS SHALL BE STARTED AND STOPPED BY THE DCP OR REMOTELY AT THE ECC.

1.2 FANS SHALL BE SOFTWARE INTERLOCKED TO OPERATE WITH AIR HANDLING UNIT 307-AC2, AND SHALL BE DISABLED DURING 307-AC2 UNOCCUPIED MODE.

1.3 FAN STATUS INPUTS ARE EXISTING FOR EXHAUST FANS 307-EF3 IN ROOMS 105 & 106. PROVIDE CURRENT SENSORS ON EXISTING FAN POWER FEEDERS FOR 307-EF1 AND 307-EF5, TO INDICATE STATUS OF FANS TO DCP.



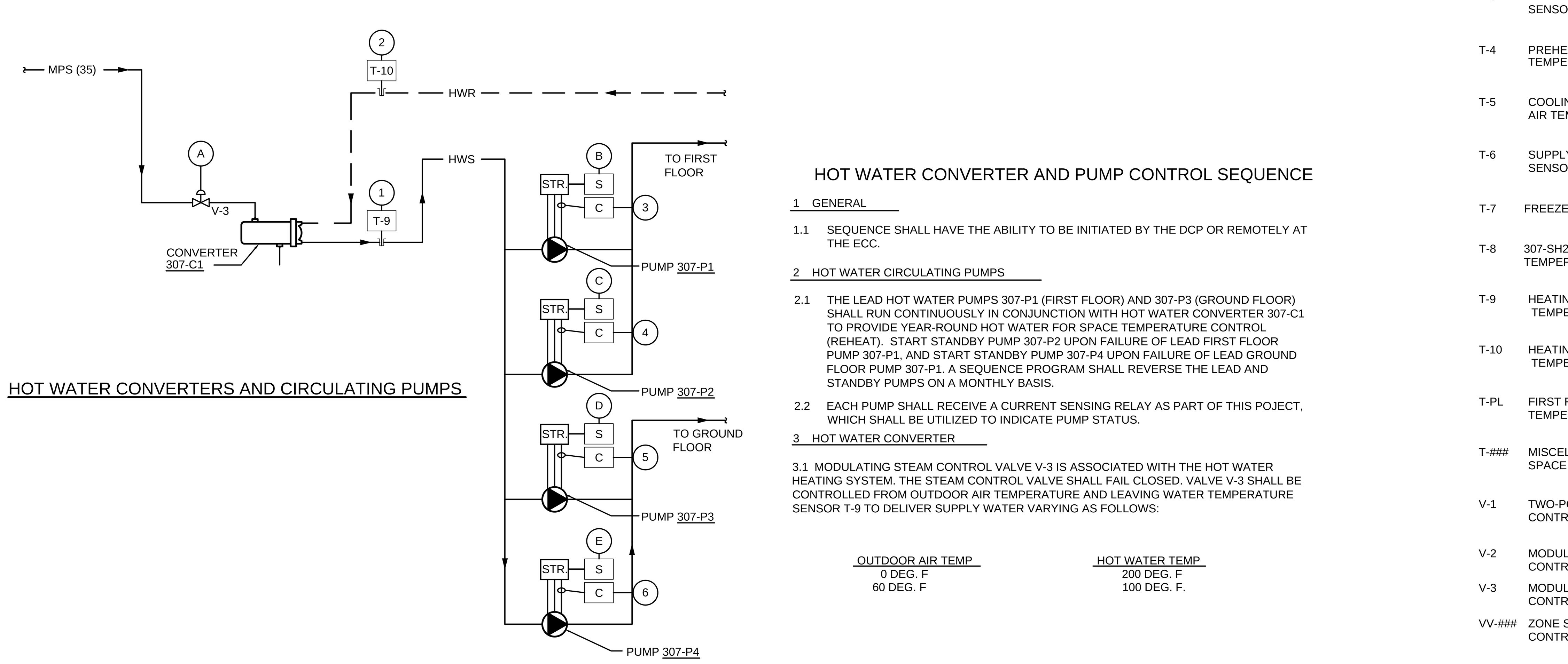
FIRST FLOOR MECHANICAL ROOM EXHAUST FAN

1 EXHAUST FAN CONTROLS

1.1 EXHAUST FAN SHALL BE STARTED AND STOPPED BY THE DCP OR REMOTELY AT THE ECC.

1.2 WHEN MECHANICAL ROOM SPACE TEMPERATURE SENSOR DETECTS TEMPERATURE IN EXCESS OF 80 DEG. F (ADJUSTABLE), EXHAUST FAN 307-EF8 SHALL START. WHEN TEMPERATURE IN MECHANICAL ROOM DROPS BELOW 75 DEG. F (ADJUSTABLE), EXHAUST FAN 307-EF8 SHALL STOP. FAN SHALL START AND RUN FOR TEN MINUTES ONCE PER DAY, AT THE SAME TIME EVERY DAY.

1.3 PROVIDE CURRENT SENSOR ON EXISTING FAN POWER FEEDER TO INDICATE STATUS OF FAN TO DCP.



HOT WATER CONVERTERS AND CIRCULATING PUMPS

HOT WATER CONVERTER AND PUMP CONTROL SEQUENCE

1 GENERAL

1.1 SEQUENCE SHALL HAVE THE ABILITY TO BE INITIATED BY THE DCP OR REMOTELY AT THE ECC.

2 HOT WATER CIRCULATING PUMPS

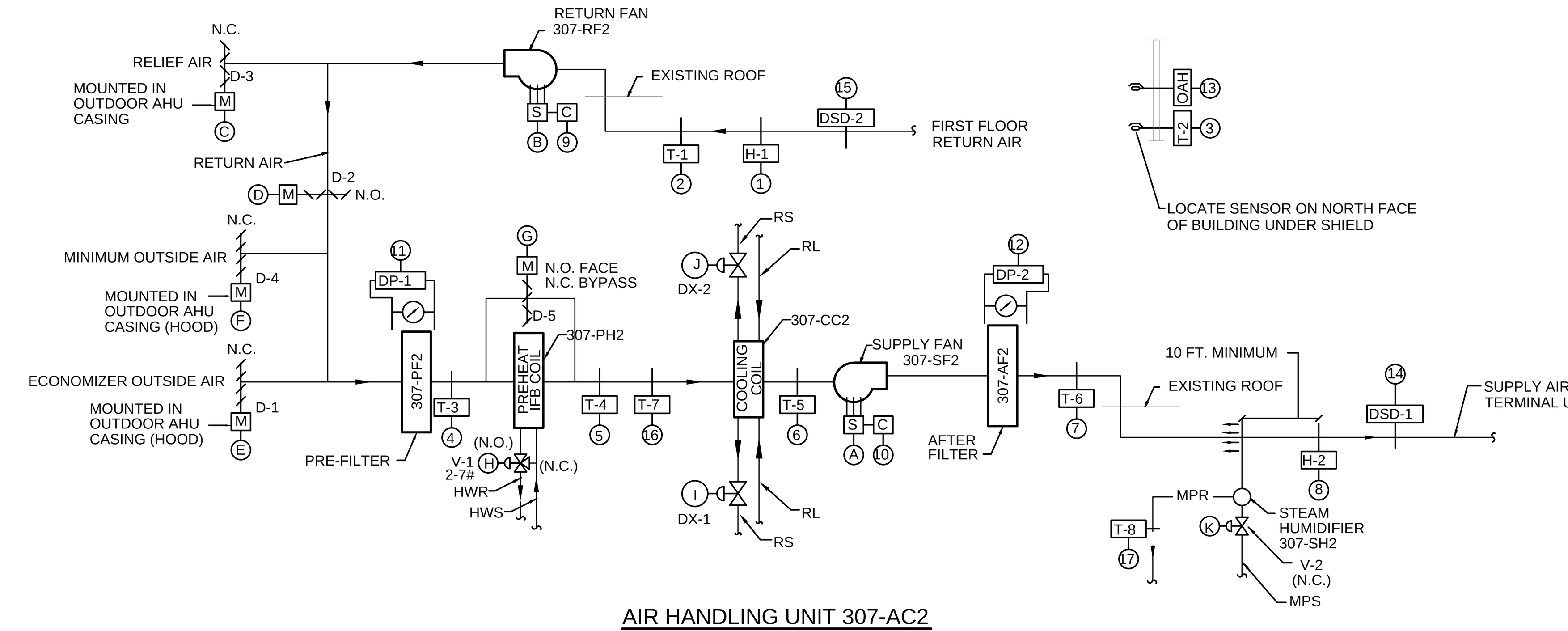
2.1 THE LEAD HOT WATER PUMPS 307-P1 (FIRST FLOOR) AND 307-P3 (GROUND FLOOR) SHALL RUN CONTINUOUSLY IN CONJUNCTION WITH HOT WATER CONVERTER 307-C1 TO PROVIDE YEAR-ROUND HOT WATER FOR SPACE TEMPERATURE CONTROL (REHEAT). START STANDBY PUMP 307-P2 UPON FAILURE OF LEAD FIRST FLOOR PUMP 307-P1, AND START STANDBY PUMP 307-P4 UPON FAILURE OF LEAD GROUND FLOOR PUMP 307-P1. A SEQUENCE PROGRAM SHALL REVERSE THE LEAD AND STANDBY PUMPS ON A MONTHLY BASIS.

2.2 EACH PUMP SHALL RECEIVE A CURRENT SENSING RELAY AS PART OF THIS POJECT, WHICH SHALL BE UTILIZED TO INDICATE PUMP STATUS.

3 HOT WATER CONVERTER

3.1 MODULATING STEAM CONTROL VALVE V-3 IS ASSOCIATED WITH THE HOT WATER HEATING SYSTEM. THE STEAM CONTROL VALVE SHALL FAIL CLOSED. VALVE V-3 SHALL BE CONTROLLED FROM OUTDOOR AIR TEMPERATURE AND LEAVING WATER TEMPERATURE SENSOR T-9 TO DELIVER SUPPLY WATER VARYING AS FOLLOWS:

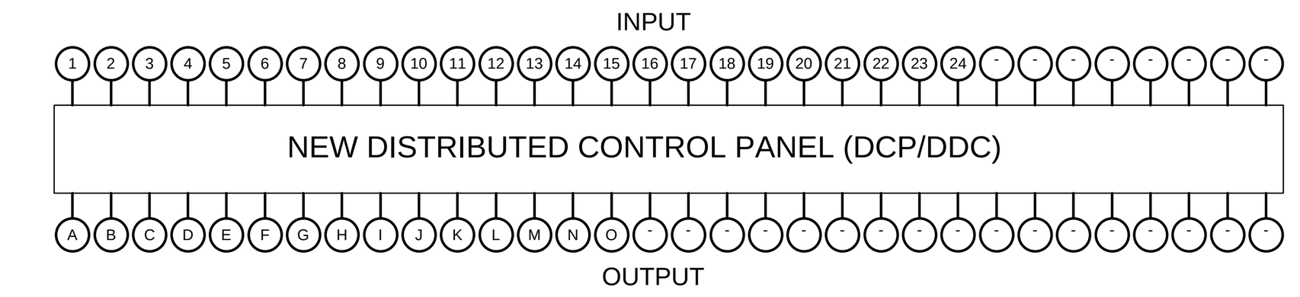
OUTDOOR AIR TEMP	HOT WATER TEMP
0 DEG. F	200 DEG. F
60 DEG. F	100 DEG. F.



AIR HANDLING UNIT 307-AC2

LEGEND (APPLIES TO PANELS 1 & 2)

C	CURRENT SENSING RELAY	TRANSMITS MOTOR CURRENT TO DCP TO INDICATE STATUS OF FANS/PUMPS.
DP-1 DP-2	DIFFERENTIAL PRESSURE SENSOR	TRANSMITS DIFFERENTIAL PRESSURE TO DCP TO INDICATE FILTER CONDITION
DCP	DIRECT DIGITAL CONTROL PANEL	CONTROLS OPERATION OF AIR HANDLING UNIT IN ACCORDANCE WITH THE SEQUENCE OF OPERATION
D-1	MODULATING OUTSIDE AIR DAMPER (ECONOMIZER)	PROPORTIONS FLOW OF OUTSIDE AIR IN RESPONSE TO DCP AND CLOSES WHEN SUPPLY FAN STOPS
D-2	MODULATING RETURN AIR DAMPER	PROPORTIONS FLOW OF RETURN AIR IN RESPONSE TO DCP AND OPENS WHEN SUPPLY FAN STOPS
D-3	MODULATING RELIEF AIR DAMPER	PROPORTIONS FLOW OF RELIEF AIR IN RESPONSE TO DCP AND CLOSES WHEN SUPPLY FAN STOPS
D-4	MINIMUM OUTSIDE AIR DAMPER	PROPORTIONS FLOW OF OUTSIDE AIR IN RESPONSE TO DCP AND CLOSES WHEN SUPPLY FAN STOPS
D-5	MODULATING PREHEAT COIL FACE & BYPASS DAMPER	PROPORTIONS FLOW OF AIR THROUGH PREHEAT COIL IN RESPONSE TO DCP TEMPERATURE CONTROL AND FREEZE PROTECTION
DSD	DUCT SMOKE DETECTORS	PROVIDE SMOKE SIGNAL TO DCP
DX-1 DX-2	DX CONDENSING UNIT START/ STOP RELAY	ENABLES/DISABLES STAGES OF DX COOLING IN RESPONSE TO DCP
ECC	ENGINEERING CONTROL CENTER	LOCATED IN BUILDING 310 MEZZANINE FOR MONITORING OF SYSTEM OPERATIONS
H-1	RETURN AIR HUMIDITY SENSOR	SENSES AND TRANSMITS RETURN AIR HUMIDITY TO DCP FOR CONTROL AND INDICATION
H-2	SUPPLY AIR HUMIDITY SENSOR	SENSES AND TRANSMITS SUPPLY AIR HUMIDITY TO DCP FOR CONTROL AND INDICATION
OAH	OUTSIDE AIR HUMIDITY SENSOR	SENSES AND TRANSMITS OUTSIDE AIR ENTHALPY TO DCP FOR CONTROL AND INDICATION
S	FAN & PUMP START/STOP RELAYS	ENABLES/DISABLES SUPPLY, RETURN, EXHAUST, AND UNIT HEATER FANS, AND HEATING HOT WATER PUMPS IN RESPONSE TO DCP
T-1	RETURN AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS RETURN AIR DRY BULB TEMPERATURE TO DCP FOR INDICATION ONLY
T-2	OUTSIDE AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS OUTSIDE AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-3	MIXED AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS MIXED AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-4	PREHEAT COIL LEAVING AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS PREHEAT AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-5	COOLING COIL LEAVING AIR TEMPERTURE	SENSES AND TRANSMITS COOLING COIL DISCHARGE AIR TEMPERATURE TO DCP FOR INDICATION ONLY
T-6	SUPPLY AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS SUPPLY AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-7	FREEZESTAT	SHUTS DOWN SUPPLY FAN UPON SENSING FREEZE CONDITION.
T-8	307-SH2 JACKET CONDENSATE TEMPERATURE SENSOR	SENSES AND TRANSMITS 307-SH2 JACKET CONDENSATE TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-9	HEATING HOT WATER SUPPLY TEMPERATURE SENSOR	SENSES AND TRANSMITS HEATING HOT WATER SUPPLY TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-10	HEATING HOT WATER RETURN TEMPERATURE SENSOR	SENSES AND TRANSMITS HEATING HOT WATER RETURN TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-PL	FIRST FLOOR CEILING PLENUM TEMPERATURE SENSOR	SENSES AND TRANSMITS CEILING PLENUM TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-###	MISCELLANEOUS ZONE CONTROL SPACE TEMPERATURE SENSOR	SENSES AND TRANSMITS ZONE SPACE TEMPERATURE TO DCP FOR CONTROL AND INDICATION
V-1	TWO-POSITION HOT WATER CONTROL VALVE	DIRECTS FLOW OF HOT WATER THROUGH PREHEAT COIL IN RESPONSE TO DCP
V-2	MODULATING STEAM HUMDIFIER CONTROL VALVE	PROPORTIONS FLOW OF STEAM TO HUMIDIFIER IN RESPONSE TO DCP
V-3	MODULATING STEAM CONVERTER CONTROL VALVE	PROPORTIONS FLOW OF STEAM TO CONVERTER IN RESPONSE TO DCP
VV-###	ZONE SPACE TEMPERATURE CONTROL SIGNAL	SENDS ANALOG OUTPUT SIGNAL TO ZONE E-P TRANSDUCERS IN RESPONSE TO DCP, TO MODULATE ZONE TEMPERATURE CONTROL DEVICES.



CONTROL PANEL 307-AC2 (PANEL#1)

CONTROL PANEL 307-AC2 POINTS LIST (PANEL#1)

	POINT ID	DEVICE TAG	DEVICE DESCRIPTION	DI	DO	AI	AO
(NOTE 1)	1	H-1	RETURN AIR HUMIDITY SENSOR			X	
(NOTE 1)	2	T-1	RETURN AIR TEMPERATURE SENSOR			X	
(NOTE 1)	3	T-2	OUTSIDE AIR TEMPERATURE SENSOR (GLOBAL POINT)			X	
(NOTE 1)	4	T-3	MIXED AIR TEMPERATURE SENSOR			X	
(NOTE 1)	5	T-4	PREHEAT COIL LEAVING AIR TEMPERATURE SENSOR			X	
(NOTE 1)	6	T-5	COOLING COIL LEAVING AIR TEMPERATURE SENSOR			X	
(NOTE 1)	7	T-6	SUPPLY AIR TEMPERATURE SENSOR			X	
(NOTE 1)	8	H-2	SUPPLY AIR HUMIDITY SENSOR (HIGH LIMIT)	X			
(NOTE 4)	9	C	RETURN FAN STATUS CURRENT SWITCH	X			
(NOTE 4)	10	C	SUPPLY FAN STATUS CURRENT SWITCH	X			
(NOTE 1)	11	DP-1	PRE FILTER PRESSURE DROP			X	
(NOTE 1)	12	DP-2	AFTER FILTER PRESSURE DROP			X	
(NOTE 1)	13	OAH	OUTSIDE AIR HUMIDITY (GLOBAL POINT)			X	
(NOTE 6)	14	DSD-1	SUPPLY AIR DUCT SMOKE DETECTOR (FIRE SYSTEM SHUTDOWN)	X			
(NOTE 6)	15	DSD-2	RETURN AIR DUCT SMOKE DETECTOR (FIRE SYSTEM SHUTDOWN)	X			
(NOTE 6)	16	T-7	FREEZESTAT	X			
(NOTE 5)	17	T-8	HUMIDIFIER 31-SH2 STEAM JACKET CONDENSATE TEMPERATURE SENSOR	X			
(NOTE 1)	18	T-PL	1ST FLOOR CEILING PLENUM TEMPERATURE			X	
(NOTE 1)	19	T-107	MECHANICAL ROOM 107 SPACE TEMPERATURE			X	
(NOTE 5)	20	C	EXHAUST FAN 307-EF8 STATUS CURRENT SWITCH	X			
(NOTE 5)	21	C	EXHAUST FAN 307-EF1 STATUS CURRENT SWITCH	X			
(NOTE 6)	22	C	EXHAUST FAN 307-EF3 (ROOM 105) STATUS CURRENT SWITCH	X			
(NOTE 6)	23	C	EXHAUST FAN 307-EF3 (ROOM 106) STATUS CURRENT SWITCH	X			
(NOTE 5)	24	C	EXHAUST FAN 307-EF5 STATUS CURRENT SWITCH	X			
(NOTE 3)	A	S	SUPPLY FAN START-STOP		X		
(NOTE 3)	B	S	RETURN FAN START-STOP		X		
(NOTE 2)	C	D-3	MODULATING RELIEF AIR DAMPER				X
(NOTE 2)	D	D-2	MODULATING RETURN AIR DAMPER				X
(NOTE 2)	E	D-1	MODULATING OUTSIDE AIR DAMPER				X
(NOTE 2)	F	D-4	TWO-POSITION OUTSIDE AIR DAMPER		X		
(NOTE 2)	G	D-5	MODULATING PREHEAT COIL FACE & BYPASS DAMPER				X
(NOTE 2)	H	V-1	TWO POSITION, THREE-WAY PREHEAT COIL VALVE		X		
(NOTE 3)	I	DX-1	CONDENSING UNIT CU-2 DX COOLING ENABLE (FIRST STAGE OF COOLING)		X		
(NOTE 3)	J	DX-2	CONDENSING UNIT CU-2 DX COOLING ENABLE (FIRST STAGE OF COOLING)		X		
(NOTE 2)	K	V-2	MODULATING STEAM HUMIDIFIER VALVE				X
(NOTE 3)	L	S	1ST FLOOR CEILING SPACE HEATERS START-STOP		X		
(NOTE 3)	M	S	ROOM 107 SPACE TEMPERATURE CONTROL (EXHAUST FAN 307-EF8 START-STOP)		X		
(NOTE 3)	N	S	FIRST FLOOR EXHAUST FANS (307-EF1, 307-EF5) START-STOP		X		
(NOTE 3)	O	S	FIRST FLOOR EXHAUST FANS 307-EF3 (QTY. 2) START-STOP		X		

NOTES:

1. REMOVE EXISTING ELECTRONIC SENSOR AND REPLACE WITH NEW. REFER TO 23 09 23 FOR NEW SENSOR SPECS. RE-USE EXISTING WIRING BETWEEN SENSOR LOCATION AND ZONE E-P TRANSDUCER.
2. EXISTING SYSTEM LEVEL PNEUMATIC CONTROL DEVICE TO REMAIN. PROVIDE NEW E/P TRANSDUCER WITHIN NEW CONTROL CABINET, TO REPLACE EXISTING TRANSDUCER, AND RE-PIPE EXISTING PNEUMATIC DEVICE TO NEW E/P TRANSDUCER.
3. EXISTING ELECTRONIC RELAY TO REMAIN, SHALL BE RE-USED.
4. REMOVE EXISTING DIFFERENTIAL PRESSURE FAN STATUS SWITCH AND REPLACE WITH CURRENT SWITCH ON POWER FEEDER TO FAN MOTOR, FOR FAN STATUS INDICATION. SEAL EXISTING DUCT OPENINGS.
5. POINT DOES NOT CURRENTLY EXIST. PROVIDE POINT AS PART OF THIS PROJECT.
6. EXISTING ELECTRONIC SENSOR TO REMAIN, SHALL BE RE-USED.
7. EXISTING ZONE LEVEL PNEUMATIC CONTROL DEVICE(S) TO REMAIN (VARIABLE VOLUME BOX DAMPER ACTUATORS, PRESSURE CONTACTORS FOR RADIANT PANELS AND ELECTRIC DUCT HEATER, FIN TUBE CONTROL VALVES, VARIABLE VOLUME BOX REHEAT COIL CONTROL VALVES, ETC.) PROVIDE NEW E/P TRANSDUCER WITHIN EXISTING CABINET AT EACH ROOM, TO REPLACE EXISTING TRANSDUCER. RE-USE EXISTING PNEUMATIC TUBING BETWEEN EXISTING PNEUMATIC DEVICES AND NEW E-P TRANSDUCER, AND RE-USE WIRING BETWEEN NEW CONTROL PANEL AND ZONE E-P TRANSDUCER.

GENERAL NOTES

1. A COMPLETE SYSTEM OF AUTOMATIC TEMPERATURE CONTROLS SHALL BE INSTALLED UNDER THIS CONTRACT AS REQUIRED TO ACCOMPLISH THE SEQUENCE OF CONTROL FOR VARIOUS ITEMS OF EQUIPMENT AND SYSTEMS AS DESCRIBED HEREINAFTER. THE SYSTEM SHALL BE A DIRECT DIGITAL CONTROL SYSTEM UTILIZING PNEUMATIC ACTUATION.
2. ALL CONTROL POWER SOURCES REQUIRED SHALL BE PROVIDED UNDER THE ATC WORK. THIS WORK SHALL INCLUDE BUT NOT BE LIMITED TO WIRING, CONDUIT, TRANSFORMERS, RELAYS AND FUSES.
3. POINTS LIST IS SHOWN AS AN AID TO THE CONTRACTOR INDICATING THE MINIMUM POINTS REQUIRED FOR CONTROL AND MONITORING. ALL INPUT AND OUTPUT POINTS, AND THEIR REQUIRED INTERFACE AND ACCESSORY HARDWARE, SHALL BE PROVIDED FOR A COMPLETE AND FUNCTIONAL CONTROL SYSTEM. IF OR WHEN ADDITIONAL POINTS ARE REQUIRED TO ACCOMPLISH THE SEQUENCES OF CONTROL SPECIFIED, THESE POINTS, ALONG WITH ADDITIONAL DIRECT DIGITAL CONTROL PANEL(S) (IF REQUIRED), SHALL ALSO BE PROVIDED.

SEQUENCE OF OPERATION FOR 307-AC2

1. GENERAL

1.1 UNIT IS NORMALLY STARTED AND STOPPED BY THE DCP OR REMOTELY AT THE ECC. H-O-A SWITCH SHALL BE KEPT IN THE "AUTO" POSITION. "HAND" AND "OFF" POSITIONS SHALL BE USED ONLY FOR MAINTENANCE.

1.2 WHEN THE UNIT IS "OFF", FOR ANY REASON, OUTSIDE AIR DAMPERS D-1 & D-4, AND RELIEF AIR DAMPER D-3 SHALL BE FULLY CLOSED, RETURN AIR DAMPER D-2 SHALL BE FULLY OPEN, AND SUPPLY AND RETURN FANS SHALL BE OFF.

1.3 WHEN THE UNIT IS "ON", SUPPLY AND RETURN FANS SHALL START, AND D-1, D-2, D-3, AND D-4 SHALL MODULATE IN ACCORDANCE WITH THE FOLLOWING SEQUENCE.

2. TEMPERATURE CONTROL

2.1 SUPPLY AIR TEMPERATURE, SENSED BY T-6, SHALL BE MAINTAINED AT SETPOINT OF 54.5 DEG. F. (ADJ.) VIA DCP BY ENABLING STAGES OF DX COOLING (307-CU2), OR MODULATING ECONOMIZER DAMPERS D-2 D-3, AND D-4, OR PREHEAT COIL VALVE V-1 AND FACE & BYPASS DAMPERS, IN SEQUENCE. SEPARATE CONTROL LOOPS SHALL BE UTILIZED FOR ECONOMIZER COOLING, MECHANICAL COOLING, AND HEATING FUNCTION. DX COOLING SHALL BE DISABLED BEFORE PREHEAT COIL VALVE V-1 OPENS, AND VICE VERSA.

3. ENTHALPY ECONOMIZER CONTROL

3.1 OUTSIDE AIR TEMPERATURE AND HUMIDITY, AND RETURN AIR TEMPERATURE AND HUMIDITY SHALL BE MEASURED, AND THE ENTHALPY OF EACH DETERMINED. IF THE ENTHALPY OF THE OUTSIDE AIR IS LESS THAN THE ENTHALPY OF THE RETURN AIR, THE ECONOMIZER SHALL BE ENABLED. WHEN THE OUTSIDE AIR ENTHALPY IS HIGHER THAN THE RETURN AIR ENTHALPY AND MECHANICAL COOLING IS AVAILABLE, THE ECONOMIZER SHALL BE DISABLED.

4. ECONOMIZER CYCLE

4.1 WHEN THE UNIT OPERATES IN THE OCCUPIED MODE, MINIMUM OUTSIDE AIR SHALL BE PROVIDED BY OPENING MINIMUM OUTSIDE AIR DAMPER D-4 AND RETURN AIR DAMPERS D-2, TO A POSITION DETERMINED BY AIR BALANCE, TO PROVIDE MINIMUM OUTSIDE AIR VOLUME. RELIEF AIR DAMPERS D-3 SHALL REMAIN CLOSED. THIS CONDITION IS THE NORMAL POSITION AND SHALL BE MAINTAINED DURING THE OCCUPIED MODE EXCEPT DURING THE "ECONOMIZER" CYCLE. DURING THE "ECONOMIZER" CYCLE, THE AMOUNT OF OUTSIDE AIR AND RELIEF AIR SHALL BE INCREASED AS REQUIRED BY MODULATING ECONOMIZER DAMPERS D-1 TO MAINTAIN THE UNIT DISCHARGE AIR TEMPERATURE SETPOINT, AS SENSED BY T-6. PROVIDE A MIXED AIR SENSOR AND LOW LIMIT CONTROL (T-3) SET AT 50 DEGREES F. TO PREVENT OVER-OPENING OF THE ECONOMIZER OUTSIDE AIR DAMPERS. ALL CONTROL SETPOINTS SHALL BE FULLY ADJUSTABLE TO MEET JOB CONDITIONS. MINIMUM OUTSIDE AIR VOLUME SHALL BE 15% OF SUPPLY AIR VOLUME. SUPPLY AND RETURN AIRFLOW SHALL BE MEASURED PRIOR TO STARTING THIS WORK, AND SHALL BE NOTED ON AS-BUILT CONTROL DRAWINGS, ALONG WITH MINIMUM OUTSIDE AIR VOLUME.

5. AIR FLOW CONTROL

5.1 EXISTING SUPPLY AND RETURN FAN MOTOR STARTERS SHALL RESPOND TO START/STOP COMMANDS AND ALL SAFETIES (FREEZE, SMOKE, ETC.) WHETHER IN THE HAND OR AUTOMATIC MODE.

6. HUMIDITY CONTROL

6.1 WHEN THE DCP IS NOT CALLING FOR HUMIDITY, SENSED BY RETURN AIR HUMIDITY SENSOR H-1, MODULATING HUMIDIFIER CONTROL VALVE V-2 SHALL REMAIN CLOSED. DCP SHALL ALSO CLOSE VALVE V-2 WHENEVER THE OUTSIDE AIR TEMPERATURE IS ABOVE 55 DEG. F, OR WHENEVER THE SUPPLY FAN IS OFF.

6.2 RETURN AIR HUMIDITY, SENSED BY H-1, SHALL BE MAINTAINED AT SETPOINT (30% RH, ADJUSTABLE) VIA DCP BY MODULATING HUMIDIFIER CONTROL VALVE V-2 TO MAINTAIN THE DESIRED HUMIDITY. THE DCP SHALL OVERRIDE THIS CONTROL TO MAINTAIN A MAXIMUM HUMIDITY LEVEL OF 80% AS SENSED BY H-2. VALVE V-2 SHALL BE INTERLOCKED WITH JACKET CONDENSATE TEMPERATURE SWITCH T-8, TO KEEP THE HUMIDIFIER OFF UNTIL JACKET CONDENSATE TEMPERATURE APPROACHES STEAM TEMPERATURE.

7. FREEZE PROTECTION

7.1 UPON CALL FOR HEAT, 3-WAY, 2-POSITION PREHEAT COIL VALVE V-1 SHALL OPEN TO THE COIL AND CLOSE TO THE BYPASS, AND PREHEAT COIL FACE & BYPASS DAMPERS SHALL MODULATE TO MAINTAIN UNIT DISCHARGE AIR TEMPERATURE SETPOINT.

7.2 IF THE PREHEAT COIL DISCHARGE AIR TEMPERATURE AS SENSED BY T-4 FALLS BELOW 40 DEG.F, AN ALARM SIGNAL SHALL INDICATE AT THE DCP AND ECC. IF THE PREHEAT COIL DISCHARGE TEMPERATURE FALLS BELOW 35 DEG.F AS SENSED BY FREEZESTAT T-7, THE SUPPLY AND RETURN FANS SHALL SHUT DOWN AND A CRITICAL ALARM SHALL INDICATE AT THE DCP AND ECC. T-7 SHALL BE HARDWIRED TO THE SUPPLY FAN SAFETY CIRCUIT TO SHUT DOWN THE UNIT IN THE HAND OR AUTOMATIC MODE. T-7 SHALL REQUIRE MANUAL RESET AT THE DEVICE.

8. AUTOMATIC SHUTDOWN / RESTART

8.1 WHEN SMOKE IS DETECTED BY EITHER THE SUPPLY OR RETURN DUCT SMOKE DETECTOR, THE SUPPLY AND RETURN AIR FANS AND INTERLOCKED EXHAUST FANS 307-EF1, 307-EF3, AND 307-EF5 SHALL SHUT "OFF", REMOTE FIRST FLOOR SMOKE DAMPERS SHALL CLOSE, AND A SUPERVISORY SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SYSTEM, AND A SUPERVISORY SIGNAL SHALL INDICATE AT THE DCP AND ECC. SUPPLY AND RETURN FANS AND INTERLOCKED EXHAUST FANS SHALL RESTART AND SMOKE DAMPERS SHALL OPEN WHEN WHEN THE FIRE ALARM CIRCUIT IS RESET. REFER TO FLOOR PLANS FOR LOCATION OF EXISTING REMOTE SMOKE DAMPERS.

9. DISCHARGE AIR RESET

9.1 THE AIR HANDLING UNIT CONTROLS SHALL PROVIDE DISCHARGE AIR TEMPERATURE CONTROL BASED ON ZONE DEMAND DEVIATION FROM SETPOINT. ALL ZONES SHALL BE SAMPLED AND THE ZONE FURTHEST FROM SETPOINT SHALL GOVERN. AS THE DEVIATION FROM SETPOINT DECREASES, THE DISCHARGE AIR SHALL BE RESET. 54.5 DEG. F AND 62 DEG. F SHALL BE THE LOW AND HIGH RESET LIMITS, RESPECTIVELY. ALL CONTROL SETPOINTS (INCLUDING HIGH AND LOW SET POINTS FOR DISCHARGE AIR TEMPERATURE) SHALL BE FULLY ADJUSTABLE TO MEET JOB CONDITIONS.

10. FILTER CONDITION MONITORING

10.1 NEW FILTER DIFFERENTIAL PRESSURE SENSORS DP-1 AND DP-2 SHALL INDICATE PRESSURE DIFFERENTIAL ACROSS FILTER BANKS AT ALL TIMES. WHEN PRESSURE RISES ABOVE VA'S RECOMMENDED CHANGEOVER PRESSURE DROP (0.66" FOR PREFILTERS, 0.68" FOR AFTER FILTERS), AN ALARM SHALL INDICATE AT THE DCP AND ECC. ALL SETPOINTS SHALL BE ADJUSTABLE.

11. UNOCCUPIED MODE

11.1 307-AC2 AND INTERLOCKED EXHAUST FANS SHALL BE ABLE TO BE SCHEDULED FOR OCCUPIED/UNOCCUPIED 7-DAY AND HOLIDAY OPERATION. PROVIDE START/STOP SOFTWARE INTERLOCK BETWEEN UNIT SUPPLY & RETURN FANS AND REMOTE EXHAUST FANS 307-EF1, 307-EF3, AND 307-EF5. DURING THE OCCUPIED MODE, THE TEMPERATURE CONTROLS SHALL FUNCTION AS SPECIFIED. DURING UNOCCUPIED MODE, THE AIR HANDLING UNIT AND INTERLOCKED REMOTE EXHAUST FANS SHALL REMAIN OFF.
INITIAL SCHEDULE - UNIT SHALL OPERATE 7 DAYS A WEEK, 7:00 AM TO 5:00 PM. UNIT SHALL BE OFF AFTER SCHEDULED HOURS. COORDINATE EXACT SCHEDULE WITH COR.
UNIT SHALL INCLUDE MORNING WARM-UP AND COOL DOWN PROGRAMS, WITH OPTIMAL START. REFER TO 23 09 23 FOR MORE DETAILS ON THIS CONTROL.

Revisions | Date

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Drawing Title: BUILDING 307 CONTROLS AND AUTOMATION

Approved: Chief, Engineering Service

Project Title: DVAMC IMPROVE BUILDING AUTOMATION SYSTEM

Building Number: 307 | Checked: PCW | Drawn: JAC

Location: Dayton, Ohio

Date: 05/23/2014

Project No.: VA Project No. 552-15-207

Drawing Number: MC307B

Dwg. of

Planning & Design · Department of Veterans Affairs

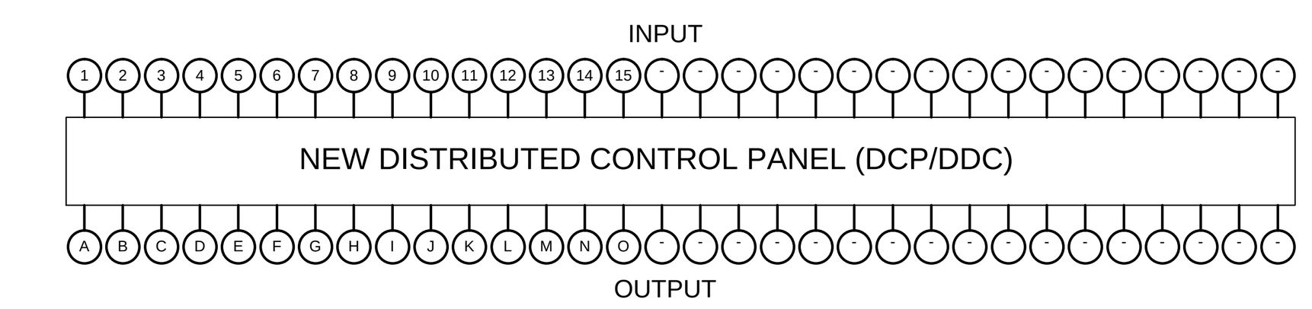
PROJECT NO. 2013-04011 HEAPY ENGINEERING DAYTON/COLUMBUS, OHIO & INDIANAPOLIS, INDIANA MECHANICAL ELECTRICAL COMMISSIONING TECHNOLOGY PLOTTED BY: JACoyle PLOT/EDIT DATE: May 22, 2014

LEGEND (APPLIES TO PANEL #3)

DCP	DIRECT DIGITAL CONTROL PANEL	CONTROLS OPERATION OF AIR HANDLING UNIT IN ACCORDANCE WITH THE SEQUENCE OF OPERATION
ECC	ENGINEERING CONTROL CENTER	LOCATED IN BUILDING 310 MEZZANINE FOR MONITORING OF SYSTEM OPERATIONS
T-###	MISCELLANEOUS ZONE CONTROL SPACE TEMPERATURE SENSOR	SENSES AND TRANSMITS ZONE SPACE TEMPERATURE TO DCP FOR CONTROL AND INDICATION
VV-###	ZONE SPACE TEMPERATURE CONTROL SIGNAL	SENDS ANALOG OUTPUT SIGNAL TO ZONE E-P TRANSDUCERS IN RESPONSE TO DCP, TO MODULATE ZONE TEMPERATURE CONTROL DEVICES.

GENERAL NOTES

1. A COMPLETE SYSTEM OF AUTOMATIC TEMPERATURE CONTROLS SHALL BE INSTALLED UNDER THIS CONTRACT AS REQUIRED TO ACCOMPLISH THE SEQUENCE OF CONTROL FOR VARIOUS ITEMS OF EQUIPMENT AND SYSTEMS AS DESCRIBED HEREINAFTER. THE SYSTEM SHALL BE A DIRECT DIGITAL CONTROL SYSTEM UTILIZING PNEUMATIC ACTUATION.
2. ALL CONTROL POWER SOURCES REQUIRED SHALL BE PROVIDED UNDER THE ATC WORK. THIS WORK SHALL INCLUDE BUT NOT BE LIMITED TO WIRING, CONDUIT, TRANSFORMERS, RELAYS AND FUSES.
3. POINTS LIST IS SHOWN AS AN AID TO THE CONTRACTOR INDICATING THE MINIMUM POINTS REQUIRED FOR CONTROL AND MONITORING. ALL INPUT AND OUTPUT POINTS, AND THEIR REQUIRED INTERFACE AND ACCESSORY HARDWARE, SHALL BE PROVIDED FOR A COMPLETE AND FUNCTIONAL CONTROL SYSTEM. IF OR WHEN ADDITIONAL POINTS ARE REQUIRED TO ACCOMPLISH THE SEQUENCES OF CONTROL SPECIFIED, THESE POINTS, ALONG WITH ADDITIONAL DIRECT DIGITAL CONTROL PANEL(S) (IF REQUIRED), SHALL ALSO BE PROVIDED.



NORTH STAIRWELL CONTROL PANEL (PANEL #3)

ROOM SW1 ZONE CONTROL PANEL POINTS LIST (PANEL#3)

	POINT ID	DEVICE TAG	DEVICE DESCRIPTION	POINT TYPE DI	DO	AI	AO
(NOTE 1)	1	T-112	ROOM 112 SPACE TEMPERATURE			X	
(NOTE 1)	2	T-113	ROOM 113 SPACE TEMPERATURE			X	
(NOTE 1)	3	T-114	ROOM 114 SPACE TEMPERATURE			X	
(NOTE 1)	4	T-116	ROOM 116 SPACE TEMPERATURE			X	
(NOTE 1)	5	T-117	ROOM 117 SPACE TEMPERATURE			X	
(NOTE 1)	6	T-118	ROOM 118 SPACE TEMPERATURE			X	
(NOTE 1)	7	T-C14	CORRIDOR C-1-4 SPACE TEMPERATURE			X	
(NOTE 1)	8	T-120A	ROOM 120A SPACE TEMPERATURE			X	
(NOTE 1)	9	T-120	ROOM 120 SPACE TEMPERATURE			X	
(NOTE 1)	10	T-128	ROOM 128 SPACE TEMPERATURE			X	
(NOTE 1)	11	T-129	ROOM 129 SPACE TEMPERATURE			X	
(NOTE 1)	12	T-130	ROOM 130 SPACE TEMPERATURE			X	
(NOTE 1)	13	T-131	ROOM 131 SPACE TEMPERATURE			X	
(NOTE 1)	14	T-132	ROOM 132 SPACE TEMPERATURE			X	
(NOTE 1)	15	T-133	ROOM 133 SPACE TEMPERATURE			X	
(NOTE 2)	A	VV-112	ROOM 112 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, HOT WATER FIN TUBE)				X
(NOTE 2)	B	VV-113	ROOM 113 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, HOT WATER FIN TUBE)				X
(NOTE 2)	C	VV-114	ROOM 114 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, HOT WATER FIN TUBE)				X
(NOTE 2)	D	VV-116	ROOM 116 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, HOT WATER FIN TUBE)				X
(NOTE 2)	E	VV-117	ROOM 117 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, HOT WATER FIN TUBE)				X
(NOTE 2)	F	VV-118	ROOM 118 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, HOT WATER FIN TUBE)				X
(NOTE 2)	G	VV-C14	CORRIDOR C-1-4 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX)				X
(NOTE 2)	H	VV-120A	ROOM 120A SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, HOT WATER FIN TUBE)				X
(NOTE 2)	I	VV-120	ROOM 120 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, HOT WATER FIN TUBE)				X
(NOTE 2)	J	VV-128	ROOM 128 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 2)	K	VV-129	ROOM 129 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 2)	L	VV-130	ROOM 130 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 2)	M	VV-131	ROOM 131 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 2)	N	VV-132	ROOM 132 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, ELECTRIC RADIANT PANELS)				X
(NOTE 2)	O	VV-133	ROOM 133 SPACE TEMPERATURE CONTROL (VARIABLE VOLUME BOX, ELECTRIC RADIANT PANELS)				X

NOTES:

1. REMOVE EXISTING ELECTRONIC SENSOR AND REPLACE WITH NEW. REFER TO 23 09 23 FOR NEW SENSOR SPECS. RE-USE EXISTING WIRING BETWEEN SENSOR LOCATION AND ZONE E-P TRANSDUCER.
2. EXISTING ZONE LEVEL PNEUMATIC CONTROL DEVICE(S) TO REMAIN (VARIABLE VOLUME BOX DAMPER ACTUATORS, PRESSURE CONTACTORS FOR RADIANT PANELS AND ELECTRIC DUCT HEATER, FIN TUBE CONTROL VALVES, VARIABLE VOLUME BOX REHEAT COIL CONTROL VALVES, ETC.) PROVIDE NEW E/P TRANSDUCER WITHIN EXISTING CABINET AT EACH ROOM, TO REPLACE EXISTING TRANSDUCER. RE-USE EXISTING PNEUMATIC TUBING BETWEEN EXISTING PNEUMATIC DEVICES AND NEW E-P TRANSDUCER, AND RE-USE WIRING BETWEEN NEW CONTROL PANEL AND ZONE E-P TRANSDUCER.

Revisions | Date

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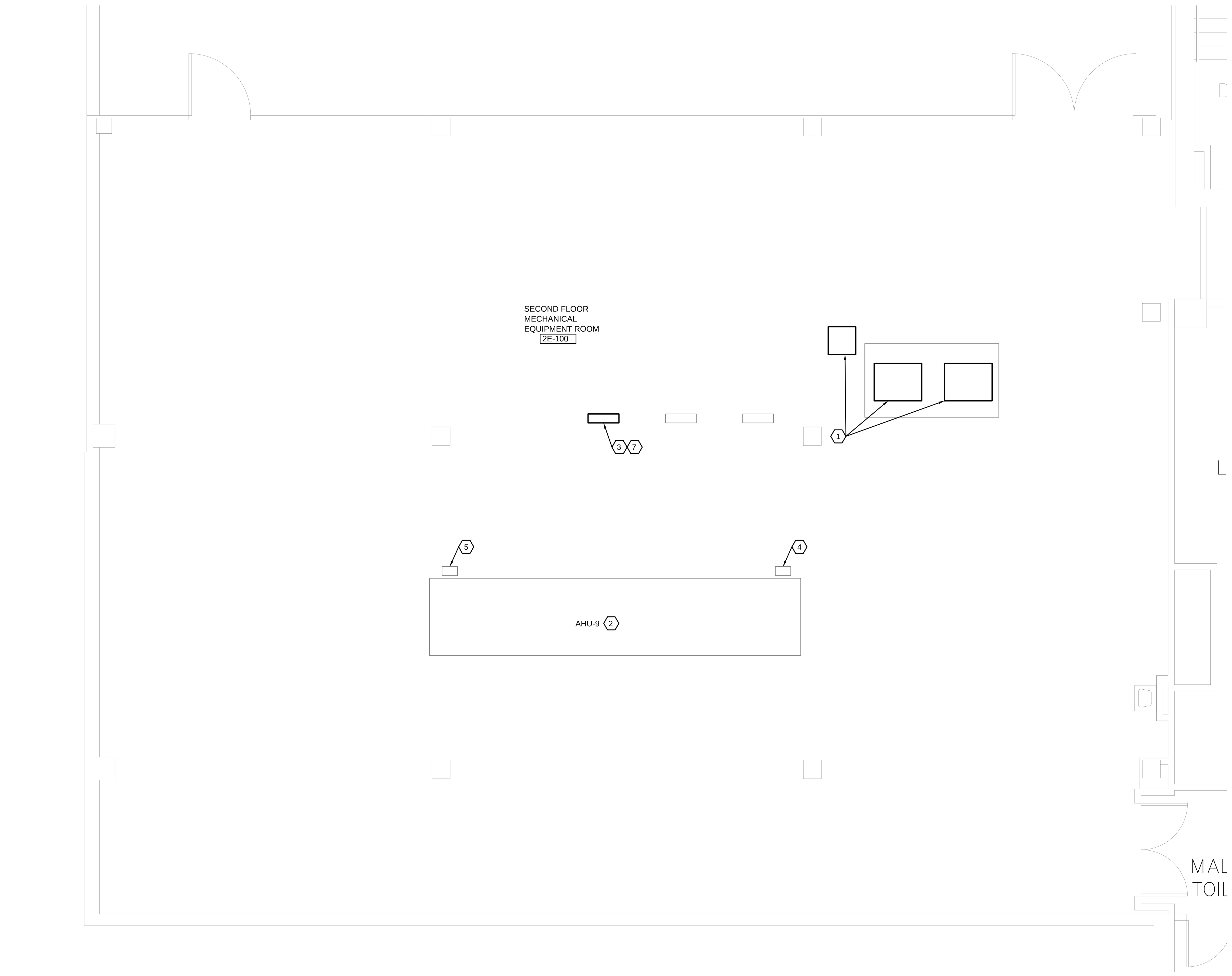
Drawing Title: BUILDING 307 CONTROLS AND AUTOMATION
Approved: Chief, Engineering Service
Project Title: DVAMC IMPROVE BUILDING AUTOMATION SYSTEM
Building Number: 307 | Checked: PCW | Drawn: JAC
Location: Dayton, Ohio
Date: 05/23/2014
Project No.: VA Project No. 552-15-207
Drawing Number: MC307C
Dwg. of
Planning & Design
Department of Veterans Affairs

PROJECT NO. 2013-04011
HEAPY ENGINEERING
DAYTON/COLUMBUS, OHIO & INDIANAPOLIS, INDIANA
MECHANICAL ELECTRICAL COMMISSIONING TECHNOLOGY
PLOTTED BY: JACoyle
PLOT/EDIT DATE: May 22, 2014



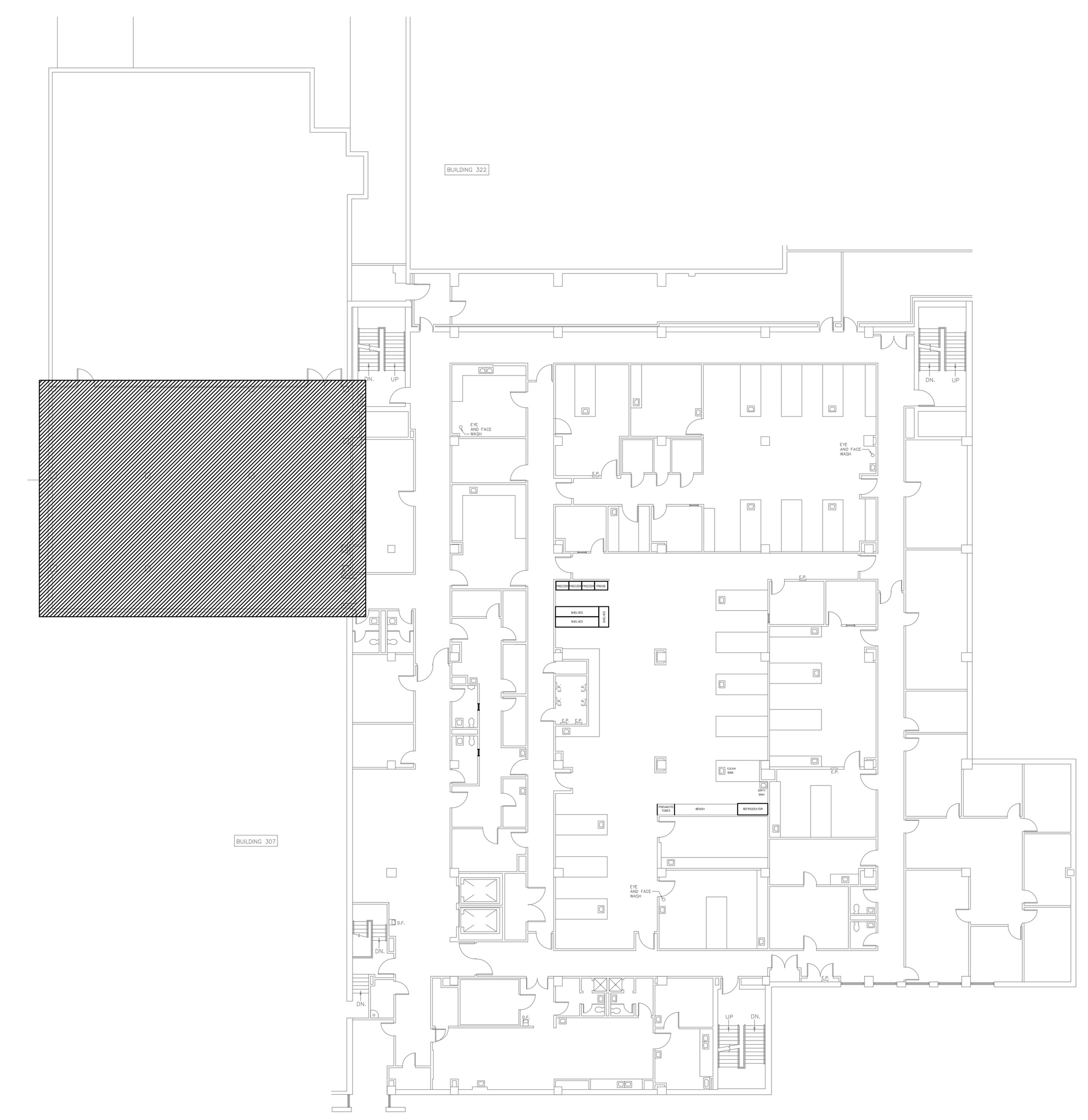
2ND FLOOR MECHANICAL ROOM PLAN
SCALE: 1/4" = 1'-0"

1.1 FOR EACH COMPRESSOR PACKAGE, PROVIDE THE FOLLOWING FOR MONITORING AND LEAD/LAG CONTROL: START/STOP RELAY FOR ENABLE/DISABLE THROUGH BAS, CURRENT SWITCH FOR STATUS INDICATION, AND PRESSURE SENSOR IN MAIN SUPPLY LINE, LOCATED IN DOWNSTREAM PIPING COMMON TO BOTH COMPRESSORS. PRESSURE SENSOR SHALL HAVE DIGITAL DISPLAY FOR LOCAL INDICATION. ALTERNATE COMPRESSORS ON A MONTHLY BASIS.

1.2 PROVIDE ALARMS AT ECC, AS FOLLOWS: IF A COMPRESSOR IS ENABLED AND STATUS IS NOT PROVEN AFTER A 2 MINUTE DELAY, OR IF MAIN SUPPLY LINE PRESSURE REMAINS HIGHER OR LOWER THAN SETPOINT BY MORE THAN 10% FOR 2 CONSECUTIVE MINUTES.

1.3 ALL SETPOINTS AND PARAMETERS SHALL BE ADJUSTABLE THROUGH THE BAS. PROVIDE EQUIPMENT AND FLOOR PLAN GRAPHICS AT THE ECC.

COMPRESSOR CONTROLS



KEYPLAN - 2ND FLOOR

GENERAL NOTES

A REFER TO SHEET M001 FOR LEGEND, ABBREVIATIONS, AND ADDITIONAL GENERAL NOTES.

⬡ NOTES

1 REMOVE EXISTING PACKAGED SCREW COMPRESSOR UNITS AND ASSOCIATED REFRIGERATED AIR DRYER, AND REPLACE WITH NEW. EACH NEW COMPRESSOR PACKAGE SHALL HAVE THE FOLLOWING MINIMUM PERFORMANCE: 37 CFM, 125 PSIG RATED OPERATING PRESSURE, 10 HP, 460V-3PH, SINGLE POINT CONNECTION. REFER TO 23 15 00 FOR ADDITIONAL REQUIREMENTS. RE-USE EXISTING POWER CIRCUIT(S) - DISCONNECT FROM EXISTING EQUIPMENT AND RECONNECT TO NEW.

2 EXISTING AIR HANDLING UNIT TO REMAIN. REFER TO SHEET MC310 FOR CONTROLS SCOPE.

3 EXISTING ANDOVER PANEL CONTROLS AIR HANDLING UNIT AHU-9. REMOVE EXISTING ANDOVER CONTROL PANEL AND PROVIDE NEW DDC PROGRAMMABLE EQUIPMENT CONTROLLER. PROVIDE NEW CAT-5E NETWORK CABLE BETWEEN NEW BUILDING CONTROLLER AND EXISTING VA NETWORK SWITCH. RE-USE EXISTING POWER CIRCUIT - DISCONNECT FROM EXISTING PANEL AND RECONNECT TO NEW.

4 EXISTING AHU SUPPLY FAN VFD TO REMAIN.

5 EXISTING AHU RETURN FAN VFD TO REMAIN.

6 EXISTING VA NETWORK CLOSET. CONNECT CAT-5E NETWORK CABLE FROM NEW BUILDING CONTROLLER TO EXISTING VA NETWORK SWITCH IN CLOSET. PROVIDE A MINIMUM OF TWO WEEKS NOTICE TO COR, IN ADVANCE OF ANTICIPATED CONNECTION TO NETWORK SWITCH AND NEED FOR IP ADDRESS.

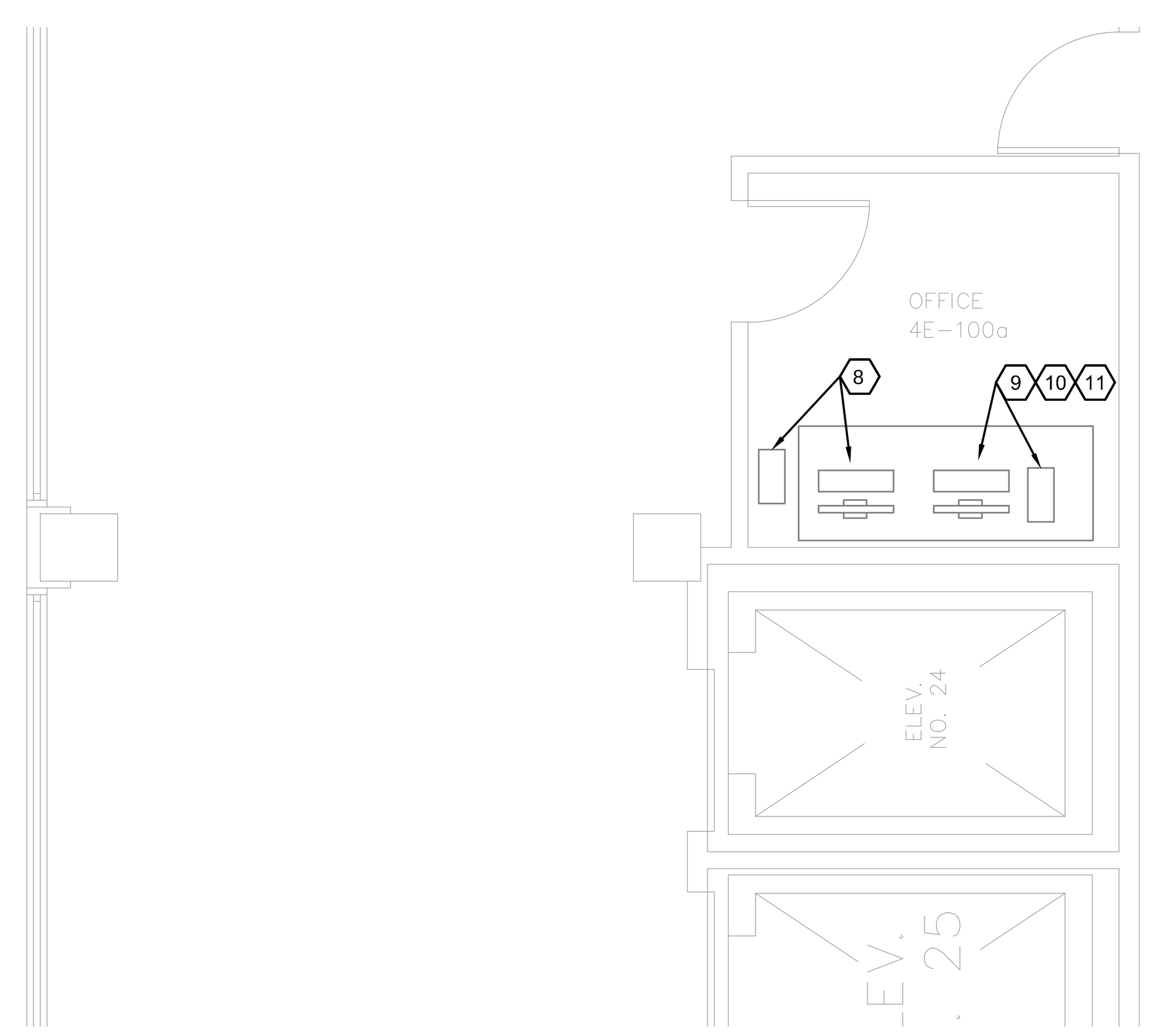
7 INTEGRATE CONTROLS FOR NEW COMPRESSORS IN THIS ROOM INTO BAS THROUGH THIS PANEL.

8 EXISTING ANDOVER CONTROLS HEAD-END (WORKSTATION) LOCATED IN THIS ROOM TO REMAIN.

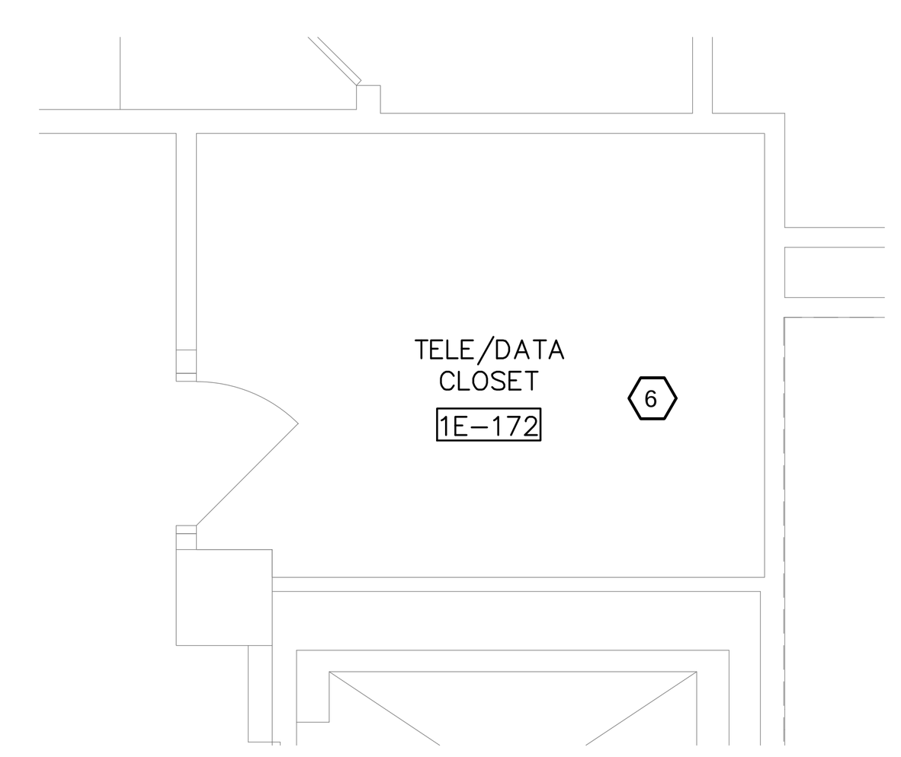
9 EXISTING NIAGARA AX ENGINEERING CONTROL CENTER (ECC) LOCATED IN THIS ROOM (CENTRAL SERVER AND WORKSTATION, WITH NIAGARA AX WEB SUPERVISOR SOFTWARE) SHALL REMAIN.

10 AT COMPLETION OF PROJECT CONSTRUCTION, FURNISH AND INSTALL NIAGARA AX SOFTWARE UPDATES TO LATEST VERSION, FOR ALL EXISTING JACE CONTROLLERS ON CAMPUS, THROUGH ECC (60 EXISTING CONTROLLERS). ALSO PURCHASE AND TURN OVER TO VA, ONE ADDITIONAL LICENSE UPGRADE FOR 70 CONTROLLERS, FOR FUTURE INSTALLATION BY VA. UNDER DEDUCT ALTERNATE #1, DELETE PURCHASE OF 70 LICENSES FOR FUTURE.

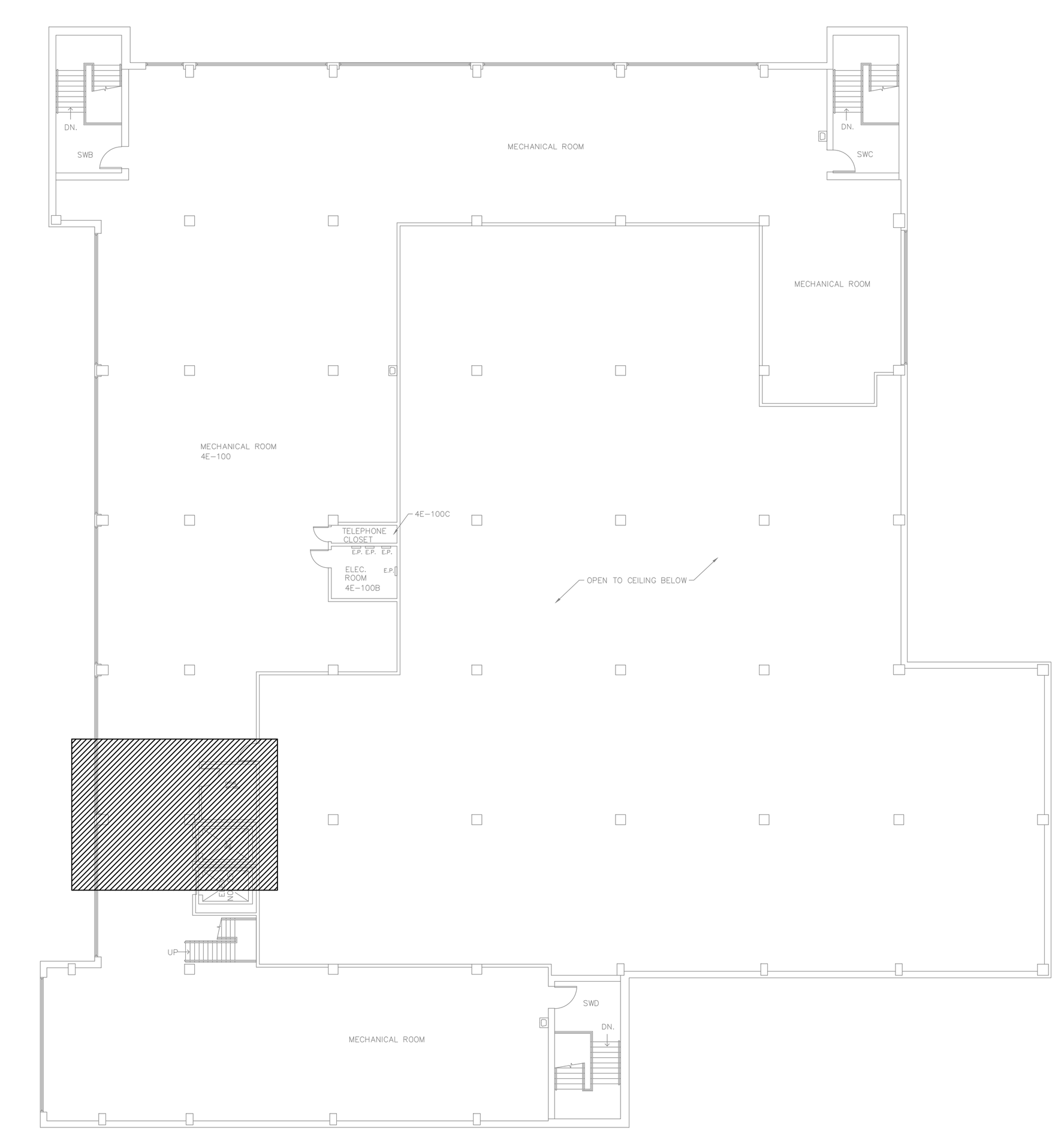
11 GRAPHICS FOR EXISTING SYSTEMS INTEGRATED TO NIAGARA AX HEAD-END SHALL BE UPGRADED UNDER THIS CONTRACT AS SPECIFIED IN 23 09 23 (2.2-E-5), TO PROVIDE FLOOR PLAN GRAPHICS FOR EACH BUILDING.



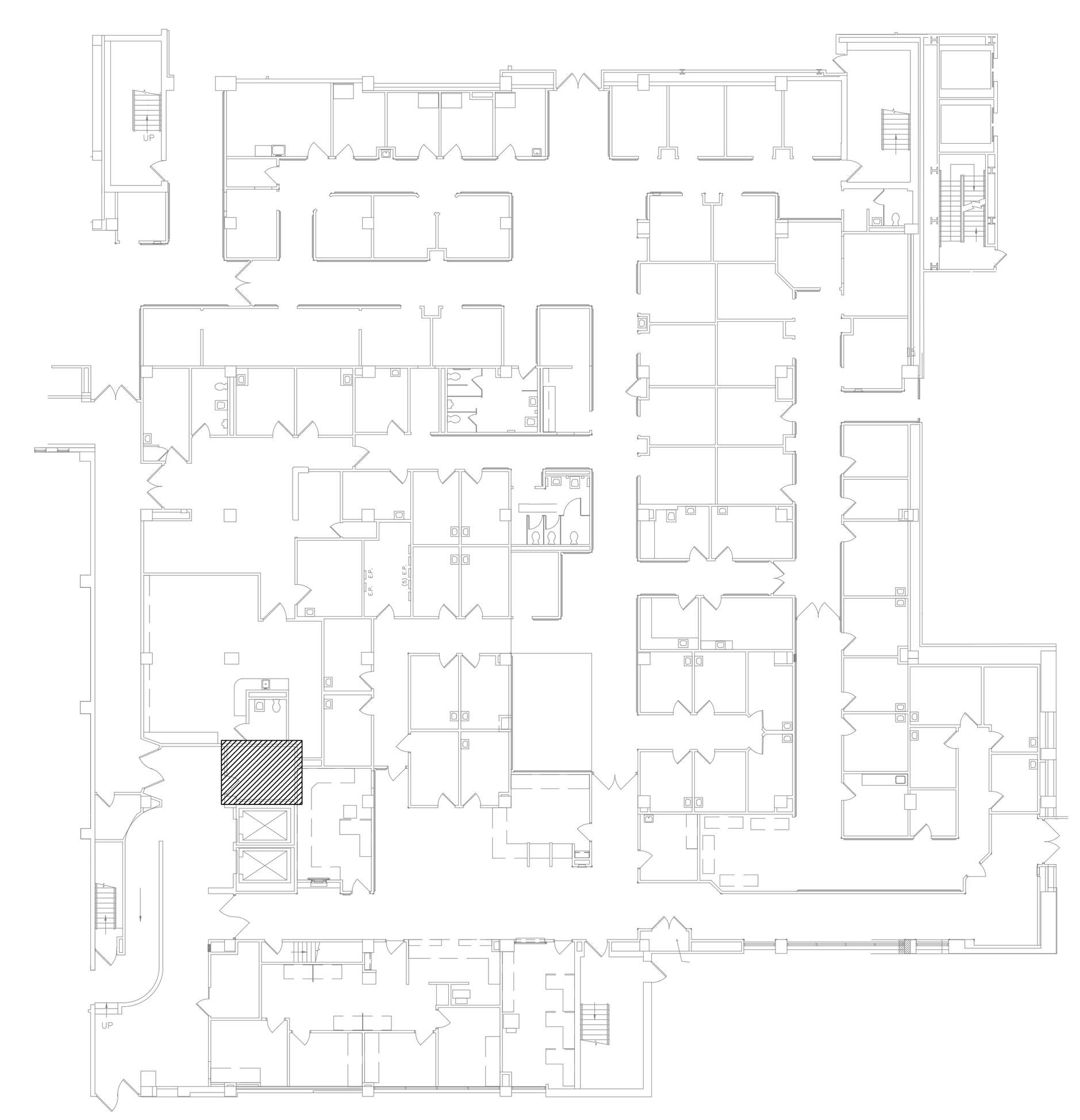
4TH FLOOR MECHANICAL MEZZANINE PLAN
SCALE: 1/4" = 1'-0"



PARTIAL FIRST FLOOR PLAN
SCALE: 1/4" = 1'-0"



KEYPLAN - 4TH FLOOR



KEYPLAN - 1ST FLOOR

Revisions | Date

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PROJECT NO. 2013-04011 FIRM LICENSE NO. 01528

Drawing Title	BUILDING 310 FLOOR PLANS, CONTROLS AND AUTOMATION
Approved: Chief, Engineering Service	
Project Title	DVAMC IMPROVE BUILDING AUTOMATION SYSTEM
Building Number	310
Checked	PCW
Drawn	JAC
Location	Dayton, Ohio
Date	05/23/2014
Project No.	VA Project No. 552-15-207
Drawing Number	M310
Dwg. of	

Planning & Design
Department of Veterans Affairs

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MECHANICAL EQUIPMENT SEQUENCES OF OPERATION

1.1. GENERAL

A. THE NEW PROGRAMMABLE EQUIPMENT CONTROLLER (PEC) SHALL PROVIDE MASTER SCHEDULING FOR ALL EQUIPMENT SO NOTED HEREIN. THIS TIMECLOCK FUNCTION SHALL PROVIDE THE ABILITY TO SCHEDULE EVENTS 24 HOURS PER DAY, 7 DAYS PER WEEK, 365 DAYS PER YEAR (AND 366 FOR LEAP YEARS) BASED UPON A REAL-TIME CLOCK, AND SHALL PROVIDE TIMESTAMP ABILITY FOR ALL EVENTS (LOGS, ALARMS, ETC.). ALL TIMECLOCK FUNCTIONS OF THE PEC SHALL BE REAL-CALENDAR AND REAL-TIME BASED, AND SOFTWARE FUNCTIONS SHALL IN NO WAY BE AFFECTED BY THE 4-DIGIT VALUE OF ANY GIVEN YEAR OR LEAP YEARS.

B. WHEREVER IN THE FOLLOWING SEQUENCES OF OPERATION THE PHRASES "LOG AN ALARM OR MESSAGE", OR "SEND A MESSAGE TO THE PEC", OR SIMILAR PHRASES ARE USED, THIS SHALL MEAN THAT THE INFORMATION SHALL BE STORED IN MEMORY OF THE PEC, AND TRANSMITTED TO THE CENTRAL SYSTEM SERVER, AND THAT APPROPRIATE ALARM MESSAGES MAY BE AUTOMATICALLY TRANSMITTED AND PRINTED.

C. SYSTEM CONCEPTS: THE EXISTING HVAC SYSTEM (ER-AHU-2) IS VARIABLE-AIR-VOLUME, CONSTANT SUPPLY AIR TEMPERATURE, WITH TERMINAL REHEAT (VAVRH). SUPPLY AND RETURN FAN MOTORS ARE VARIABLE SPEED, CONTROLLED BY VARIABLE FREQUENCY DRIVES. CHILLED WATER COOLING COILS, STEAM PREHEAT COILS, STEAM HUMIDIFIERS, PREFILTERS AND FINAL FILTERS ARE MOUNTED IN THE AHU LOCATED IN THE PENTHOUSE. HOT WATER REHEAT COILS ARE LOCATED IN THE EXISTING VAV AIR TERMINAL UNITS (ATU) SUPPLYING EACH SPACE; EACH ATU/COIL IS CONTROLLED BY ONE ROOM THERMOSTAT/SENSOR. STEAM AND CHILLED WATER ARE PROVIDED TO THE AHU FROM THE EXISTING CENTRAL STEAM AND CHW SYSTEMS. REHEAT HOT WATER IS PROVIDED FROM THE EXISTING REHEAT HOT WATER SYSTEM.

1.2. EXISTING AIR HANDLING UNIT ER-AHU-2

A. THE EXISTING AIR HANDLING UNIT (ER-AHU-2) CONSISTS OF ONE SUPPLY FAN (WITH VFD), ONE RETURN FAN (WITH VFD), 30% PREFILTERS, 95% FINAL FILTERS, CHILLED WATER COOLING COILS, STEAM PREHEAT COILS (INTEGRAL FACE/BYPASS), STEAM HUMIDIFIER, AND OUTSIDE AIR, RETURN AIR AND RELIEF AIR DAMPERS. THE SUPPLY AND RETURN AIR FANS HAVE AIRFLOW MEASURING DEVICES (AFMS) MOUNTED IN THE FAN INLETS.

B. VENTILATION:

1. THE OUTSIDE AIR (OA) CFM SHALL REMAIN A FIXED QUANTITY (SETPOINT ADJUSTABLE) THROUGHOUT THE RANGE OF OPERATION OF THE VAV AHU. FAN SPEEDS AND DAMPER POSITIONS TO ACCOMPLISH THIS WERE ESTABLISHED DURING ORIGINAL TESTING AND BALANCING OF AHU, AND SHALL BE NOTED PRIOR TO REMOVAL OF EXISTING CONTROLS . INCORPORATE FAN SPEEDS AND DAMPER POSITIONS INTO NEW CONTROL SEQUENCES. AIR FLOW MEASUREMENT STATIONS (AFMS) MOUNTED IN THE SUPPLY AND RETURN AIR FAN INLETS SHALL BE USED TO DETERMINE THE INSTANTANEOUS OA BY READING/CALCULATING THE SUPPLY AIR CFM, READING/CALCULATING THE RETURN AIR CFM, AND SUBTRACTING THE TWO QUANTITIES. THE PEC SHALL THEN MODULATE THE OUTSIDE AIR (OA), RETURN AIR (RA), AND RELIEF AIR (RLFA) DAMPERS AS NECESSARY TO RESULT IN THE SETPOINT VOLUME OF OA. THE PEC SHALL CONTROL THE VARIABLE FREQUENCY DRIVES (VFD) OF THE RETURN FANS TO MAINTAIN THE NECESSARY TRACKING OF THE RETURN FANS WITH THE SUPPLY FANS. THE RETURN AIR FANS SHALL BE BALANCED AND CONTROLLED TO PROVIDE A CFM EQUAL TO THE SUPPLY CFM MINUS THE OA CFM PLUS RELIEF AIR AT ANY GIVEN INSTANT. THE PEC SHALL CONTROL THE SUPPLY FAN VFD TO MAINTAIN SETPOINT OF STATIC PRESSURE IN THE SUPPLY DUCTS, BASED UPON EXISTING DUCT STATIC PRESSURE SENSOR.

2. ECONOMIZER MODE: IN THE ECONOMIZER MODE, THE PEC SHALL MODULATE THE OUTSIDE AIR (OA). RETURN AIR (RA), AND RELIEF AIR (RLFA) DAMPERS TO MAINTAIN THE SUPPLY AIR TEMPERATURE SETPOINT (ADJUSTABLE). ECONOMIZER ACTIVATION SHALL BE BASED UPON AN ALGORITHM IN THE PEC, COMPARING THE ENTHALPY OF OA VERSUS RETURN AIR (RA), WHENEVER THE OA DRY BULB TEMPERATURE IS BELOW THE ECONOMIZER ACTIVATION DRY BULB TEMPERATURE SETPOINT (ADJUSTABLE). THE PEC ENTHALPY DETERMINATION SHALL BE BASED UPON SENSORS READING DRY BULB TEMPERATURE AND RELATIVE HUMIDITY OF THE OA AND RA, AND SHALL INITIATE ECONOMIZER OPERATION WHEN OA ENTHALPY IS LESS THAN RA ENTHALPY. THE OA, RA, AND RLFA DAMPERS SHALL BE UNDER THE CONTROL OF THE ECONOMIZER FUNCTIONS, SO LONG AS THE RESULTANT OA VOLUME EXCEEDS THE DESIGN OA CFM SETPOINT. THE OA SETPOINT (WHEN THE AHU IS IN A GIVEN MODE) SHALL BE UTILIZED AS THE MINIMUM PERMISSIBLE (LOWER LIMIT) VENTILATION QUANTITY, AND THE ECONOMIZER MODE SHALL BE OVERRIDDEN IF ITS OPERATION SHOULD RESULT IN AN OA QUANTITY LOWER THAN THE MINIMUM OA SETPOINT DESCRIBED UNDER NORMAL OPERATION. ALL EXISTING OA, RA, AND RLFA DAMPER ACTUATORS INCLUDE POSITION FEEDBACK POTENTIOMETERS TO CONFIRM THEIR POSITIONS DURING THE OPERATING SEQUENCES DESCRIBED.

A. ECONOMIZER OPERATION SHALL FUNCTION AS "FIRST STAGE" COOLING, AND SHALL BE CONTROLLED UP TO MAXIMUM (FULL OPEN) POSITIONS PRIOR TO INITIATING CHILLED WATER VALVE MODULATION. WHENEVER THE ECONOMIZER FUNCTION IS CAPABLE OF MAINTAINING SUPPLY AIR TEMPERATURE SETPOINT THE CHILLED WATER VALVE SHALL BE CLOSED.

3. FREEZE PROTECTION: AIR TEMPERATURE LOW-LIMIT (LL) SENSORS SHALL OVERRIDE ALL OTHER CONTROL SEQUENCES AND INITIATE CONTROL SEQUENCES TO PREVENT FREEZING OF COILS WHENEVER THE AVERAGE BULK MIXED AIR TEMPERATURE DOWNSTREAM OF THE PREHEAT COIL (PHC LAT) FALLS BELOW THE LL SETPOINT (ADJUSTABLE).

A. ACTIVATION DURING NORMAL OPERATION, UNOCCUPIED MODE, OR ECONOMIZER: UPON A DECREASE IN AVERAGE AIR TEMPERATURE (PHC LAT) BELOW THE LL SETPOINT, THE PEC SHALL:

1) LOG AN "AIR TEMPERATURE LOW-LIMIT CONDITION; AHU INITIATING VENTILATION DECREASE SEQUENCE" ALARM MESSAGE, ALONG WITH: TIME-OF-ALARM/DATE; ALL AIR TEMPERATURES (OA, RA, MIXED, PREHEAT COIL LAT); LL SETPOINT; THE POSITIONS OF THE OA, RA, AND RLFA DAMPERS, THE PREHEAT COIL FACE/BYPASS DAMPERS, AND PREHEAT STEAM CONTROL VALVE; THE OA, SA, AND RA CFM, THE STATUS OF ALL FANS;

2) MODULATE THE OA AND RLFA DAMPERS TOWARD CLOSED AND THE RA DAMPER TOWARD OPEN, AND SPEED UP THE RA FANS (THROUGH CONTROL OF VFD'S) TO DECREASE THE AMOUNT OF OA (INCREASE THE AMOUNT OF RA) UNTIL THE AVERAGE PHC LAT EXCEEDS THE LL SETPOINT. RA FAN SPEED SHALL BE INCREASED TO PROVIDE UP TO MAXIMUM POSSIBLE RA CFM (NOT TO EXCEED SUPPLY AIR CFM IN EITHER OCCUPIED OR UNOCCUPIED MODE); RA CFM AND FAN SPEED SETPOINTS CORRESPONDING TO THIS CONDITION WAS VERIFIED DURING ORIGINAL TESTING AND BALANCING OF UNIT TO SIMULATE BOTH OCCUPIED AND UNOCCUPIED MODES, AND SHALL BE NOTED PRIOR TO REMOVAL OF EXISTING CONTROLS , AND INCORPORATED INTO NEW CONTROL SEQUENCES.

3) REPORT THE FINAL VALUES AND POSITIONS OF ALL ITEMS LISTED IN 1), ABOVE, AFTER AIR TEMPERATURE RISES ABOVE LL. REPORT THE MESSAGE "VENTILATION CFM BELOW SETPOINT/AIR TEMPERATURE ABOVE LOW LIMIT".

4) IF AIR TEMPERATURE REMAINS BELOW LL SETPOINT AFTER THE PEC HAS COMPLETED 2) AND 3), (TAKING DAMPER ACTUATORS' STROKE TIME INTO CONSIDERATION), THEN THE PEC SHALL INITIATE A TOTAL AHU SHUTDOWN SEQUENCE TO STOP ALL FANS, CLOSE THE RA DAMPERS, AND SEND ALARM MESSAGES INDICATING "AHU SHUTDOWN ON AIR TEMPERATURE LOW-LIMIT". REPORT FINAL VALUES AND POSITIONS OF ALL ITEMS LISTED IN 1), ABOVE. NOTE: PREHEAT VALVE SHALL REMAIN UNDER THERMOSTATIC CONTROL FOR FREEZE PROTECTION DURING SHUTDOWN.

C. SUPPLY AIR:

1. NORMAL OPERATION (OCCUPIED OR UNOCCUPIED MODE): THE TOTAL SUPPLY AIR QUANTITY SHALL VARY FROM MAXIMUM AS A RESULT OF SUPPLY FAN VFD, WHICH SHALL BE CONTROLLED BY THE PEC IN RESPONSE TO EXISTING STATIC PRESSURE SENSOR REMOTELY MOUNTED IN THE SUPPLY AIR DISTRIBUTION DUCTWORK.

A. THE SUPPLY AIR STATIC PRESSURE SETPOINT SHALL BE NOTED PRIOR TO REMOVAL OF EXISTING CONTROLS , AND INCORPORATED INTO NEW CONTROL SEQUENCES. SETPOINT SHALL ALSO BE RECORDED IN DOCUMENTATION.

B. EXISTING STATIC PRESSURE HIGH-LIMIT (SPHL) SENSOR (SETPOINT ADJUSTABLE) IS LOCATED IN THE MAIN SUPPLY AIR CHAMBER OF THE AHU, AND SHALL PROVIDE EMERGENCY STOP CONTROL OF THE SUPPLY AND RETURN FANS, TO PREVENT DUCTWORK DAMAGE. UPON ACTIVATION, THE SPHL FUNCTION SHALL SEND APPROPRIATE ALARM MESSAGES (SIMILAR TO THOSE DESCRIBED UNDER FREEZE PROTECTION, HEREIN) TO THE CONTROL PANEL, AND CENTRAL SYSTEM SERVER, AND SHALL ALSO BE ENTERED IN THE ALARM LOG. FINAL SETPOINT PRESSURE FOR SPHL WAS DETERMINED DURING ORIGINAL TESTING AND BALANCING OF AHU, AND SHALL BE NOTED PRIOR TO REMOVAL OF EXISTING CONTROLS , AND INCORPORATED INTO NEW CONTROL SEQUENCES.

C. STATIC PRESSURE LOW-LIMIT (SPLL): SEE DESCRIPTION UNDER RETURN AIR CONTROL.

2. AIR TEMPERATURE CONTROL:

A. SUPPLY AIR TEMPERATURE AVERAGING SENSORS SHALL, THROUGH THE PEC, MODULATE THE CHILLED WATER VALVE(S) OF THE COOLING COIL TO MAINTAIN A CONSTANT SUPPLY AIR TEMPERATURE SETPOINT (SATSP; ADJUSTABLE) WHENEVER THE MIXED AIR TEMPERATURE (MAT) EXCEEDS THE SATSP. THE PEC SHALL PROVIDE THE CAPABILITY TO RESET THE SATSP BASED UPON A RESET SCHEDULE OF SATSP VERSUS OUTSIDE AIR TEMPERATURE.

B. IN ECONOMIZER MODE, THE OA, RA, AND RELIEF DAMPERS SHALL MODULATE TO MAINTAIN THE SATSP AS DESCRIBED UNDER THE "ECONOMIZER MODE" OF "VENTILATION", HEREIN.

C. WHEN THE MAT FALLS BELOW THE SATSP, THE PREHEAT COIL FACE/BYPASS DAMPERS AND STEAM CONTROL VALVE SHALL MODULATE TO RAISE THE AIR TEMPERATURE TO SATSP:

1) THE PEC SHALL OPEN THE STEAM CONTROL VALVE ON THE PREHEAT COIL, THEN SEQUENCE THE INTERNAL FACE AND BYPASS DAMPERS TO MAINTAIN THE PREHEAT COIL LEAVING AIR TEMPERATURE AT SETPOINT. WHENEVER THE OUTSIDE AIR TEMPERATURE IS BELOW 40 F (ADJUSTABLE), THE PREHEAT COIL VALVE SHALL BE FULLY OPEN. THE PEC SHALL MODULATE THE FACE AND BYPASS DAMPERS TO MAINTAIN TEMPERATURE AT SETPOINT.

2) WHEN THE OUTDOOR TEMPERATURE IS ABOVE A PREDETERMINED VALUE (SETPOINT ADJUSTABLE), THE DAMPERS SHALL RETURN TO THE MINIMUM POSITION (FULL BYPASS). THE PREHEAT COIL FACE/BYPASS DAMPERS SHALL BE IN THE FULL OPEN-TO-BYPASS POSITION WHENEVER THE COOLING COIL IS ACTIVE. THE PREHEAT COIL VALVE SHALL PROVIDE FLOW TO THE COIL ONLY WHEN THE OA TEMPERATURE IS BELOW A SPECIFIED VALUE (SETPOINT ADJUSTABLE). EXISTING PROGRAMMED SETPOINT SHALL BE NOTED PRIOR TO REMOVAL OF EXISTING CONTROLS , AND INCORPORATED INTO NEW CONTROL SEQUENCES.

3) EXISTING PREHEAT COIL CONTROL VALVE ACTUATOR AND FACE/BYPASS DAMPER ACTUATOR INCLUDE POSITION FEEDBACK POTENTIOMETERS TO CONFIRM THEIR POSITIONS DURING THE OPERATING SEQUENCES DESCRIBED.

D. RETURN AIR:

1. NORMAL OPERATION (OCCUPIED OR UNOCCUPIED MODE): THE RETURN AIR (RA) QUANTITY SHALL VARY FROM MAXIMUM AS A RESULT OF THE RETURN FAN VFD, WHICH SHALL BE CONTROLLED IN RESPONSE TO THE RA AIR FLOW MEASURING STATION (AFMS), AND IN CONJUNCTION WITH THE CONTROL OF OA, RA, AND RLFA DAMPERS AS DISCUSSED UNDER "VENTILATION", HEREIN.

A. THE CONTROL OF THE RA FAN SHALL BE SUCH THAT IT SHALL TRACK THE SUPPLY FAN'S OPERATION (CFM VARIATIONS) AT ALL OPERATING CONDITIONS. THE RETURN AIR FAN SHALL BE BALANCED AND CONTROLLED TO PROVIDE A CFM EQUAL TO THE SUPPLY CFM MINUS THE OA CFM PLUS RELIEF AIR AT ANY GIVEN INSTANT. THE PE SHALL CONTROL THE VARIABLE FREQUENCY DRIVE (VFD) OF THE RETURN FAN TO MAINTAIN THE PROPER CFM. SEE "FREEZE PROTECTION" FOR ADDITIONAL CONTROL SEQUENCES REQUIRED FOR THE RETURN FAN.

B. EXISTING STATIC PRESSURE LOW-LIMIT (SPLL) SENSOR (SETPOINT ADJUSTABLE) IS LOCATED IN THE MAIN RETURN AIR CHAMBER OF THE AHU, AND SHALL PROVIDE EMERGENCY STOP CONTROL OF THE SUPPLY FAN AND RETURN FANS, TO PREVENT DUCTWORK DAMAGE. UPON ACTIVATION, THE SPLL FUNCTION SHALL CAUSE APPROPRIATE ALARM MESSAGES (SIMILAR TO THOSE DESCRIBED UNDER FREEZE PROTECTION, HEREIN) TO BE ENTERED IN THE ALARM LOG. FINAL SETPOINT PRESSURE FOR SPLL WAS DETERMINED DURING ORIGINAL TESTING AND BALANCING OF AHU, AND SHALL BE NOTED PRIOR TO REMOVAL OF EXISTING CONTROLS , AND INCORPORATED INTO NEW CONTROL SEQUENCES. NOTE: PEC SHALL BE CAPABLE OF DISTINGUISHING BETWEEN SPHL AND SPLL ALARMS (A COMMON "SAFETY" POINT SHALL NOT BE SHARED).

E. SMOKE/FIRE ALARM MODE: THE PEC SHALL BE INTERLOCKED WITH THE FACILITY'S FIRE ALARM SYSTEM. DUCT SMOKE DETECTORS AT ER-AHU-2: EXISTING SMOKE DETECTORS, WHEN ACTIVATED, SHALL TURN OFF THE AHU FANS, CLOSE ALL AHU DAMPERS, AND SEND AN ALARM SIGNAL AND MESSAGE TO THE PEC WHEN SMOKE IS DETECTED IN THE AIR STREAM.

F. SYSTEM RELATIVE HUMIDITY CONTROL: EXISTING HUMIDIFIER IN ER-AHU-2 IS CONNECTED TO THE LOW PRESSURE STEAM SUPPLY FROM THE EXISTING STEAM SYSTEM. THE PEC SHALL CONTROL THE HUMIDIFIER IN ER-AHU-2 BASED UPON THE AVERAGE READING OF THE RELATIVE HUMIDITY SENSOR (RH) LOCATED IN THE RETURN AIR DUCT. THE RH READING SHALL BE COMPARED TO RH SETPOINT (SETPOINT ADJUSTABLE IN THE PEC, INITIALLY SET AT 30%) TO DETERMINE THE NEED FOR HUMIDIFICATION IN THE SPACES. UPON A CALL FOR HUMIDIFICATION, THE PEC SHALL CONTROL THE STEAM HUMIDIFIER CONTROL VALVE TO INJECT STEAM INTO THE SUPPLY AIR STREAM. EXISTING RH HIGH-LIMIT SENSOR (INITIAL SETPOINT 85%, ADJUSTABLE) IS LOCATED IN THE SUPPLY AIR OF THE AHU, AND SHALL OVERRIDE THE HUMIDIFIER CONTROL TO PREVENT SUPPLY AIR FROM RISING ABOVE 85% RH (SETPOINT ADJUSTABLE) TO PREVENT CONDENSATION IN THE SA DUCT. EXISTING HUMIDIFIER STEAM CONTROL VALVE ACTUATOR INCLUDES POSITION FEEDBACK POTENTIOMETER TO CONFIRM ITS POSITIONS DURING THE OPERATING SEQUENCES DESCRIBED.

G. COMPONENTS' STATUS AND MAINTENANCE INDICATION:

1. EXISTING DIFFERENTIAL PRESSURE SENSORS AND TRANSDUCERS (DPT) ARE MOUNTED ACROSS THE AHU FILTER BANKS. THROUGH THE PEC, THE DPT SHALL TRANSMIT "FILTER MAINTENANCE REQUIRED" ALARM MESSAGES IF THE DP ACROSS FILTER BANKS INDICATE FILTERS SHOULD BE REPLACED (ALARM SETPOINTS ADJUSTABLE; SEPARATE SETPOINTS FOR PREFILTERS AND FINAL FILTERS ARE EXISTING, AND SHALL BE NOTED PRIOR TO REMOVAL OF EXISTING CONTROLS , AND INCORPORATED INTO NEW CONTROL SEQUENCES).

A. THE PEC SHALL BE ABLE TO ACCESS AND DISPLAY THE ACTUAL DP FROM EACH DPT.

B. THE "CLEAN" FILTERS' DP WAS NOTED AT THE TIME OF ORIGINAL AHU TESTING AND BALANCING, AND SHALL BE NOTED PRIOR TO REMOVAL OF EXISTING CONTROLS , AND INCORPORATED INTO NEW CONTROL SEQUENCES. CLEAN FILTER VALUE SHALL BE DISPLAYED FOR COMPARISON TO THE ACTUAL INSTANTANEOUS READING FROM THE DPT'S.

2. EXISTING ADJUSTABLE CURRENT SENSORS (ACS) SHALL MONITOR ALL SUPPLY FANS', RETURN FANS', BOOSTER FANS', AND EXHAUST FANS' STATUS BY READING THE AMPS DRAWN BY THEIR MOTORS. ACS SHALL BE CAPABLE OF, AND SHALL BE CONFIGURED TO, DISTINGUISH BETWEEN A BROKEN FAN BELT CONDITION AND NORMAL FAN OPERATION. THROUGH THE PEC, THE ACS SHALL INDICATE THE RUN STATUS OF THE FANS.

1.3. SPACE TEMPERATURE CONTROL; VAV AND CAV REHEAT AIR TERMINAL UNITS: EXISTING PRESSURE INDEPENDENT VAVRH ATU WITH ANDOVER INFINET II I2866-V DIRECT DIGITAL CONTROLLERS ON AND A ROOM TEMPERATURE SENSOR (THERMOSTAT) TO REMAIN. INTEGRATE EXISTING ATU CONTROLLERS INTO NEW TRIDIUM JACE. PROVIDE JACE WITH ANDOVER DRIVER AS REQUIRED FOR THIS INTEGRATION. COORDINATE DRIVER REQUIREMENTS WITH ENGINEER PRIOR TO ORDERING.

1.4. RETURN AIR BOOSTER FAN ER-F-3: FAN ER-F-3 SHALL BE CONSTANT VOLUME, SHALL RUN CONTINUOUSLY, AND SHALL HAVE A KEYED SWITCH, WITH PILOT LIGHT RUN INDICATION, TO START/STOP THE FAN.

A. ER-F-3 FAN MOTOR CONTROL SHALL ALSO BE INTERLOCKED WITH THE SUPPLY AIR FAN MOTOR CONTROL OF EXISTING AIR HANDLING UNIT ER-AHU-1, AND SHALL START AND STOP IN ACCORDANCE WITH THE STATUS OF THE SUPPLY FAN. ER-F-3 FAN MOTOR SHALL BE SHUT OFF IF THE AHU SUPPLY FAN IS SHUT OFF FOR ANY REASON (EITHER BY SAFETIES, OR CONTROLS OR FIRE ALARM INTERFACE, OR MANUAL SWITCHING, ETC.).

1.7. EXHAUST FAN SYSTEMS:

A. EXISTING EXHAUST FANS ER-F-1, ER-F-2: EACH SHALL HAVE A KEYED SWITCH, WITH PILOT LIGHT RUN INDICATION, TO START/STOP EACH FAN.

B. EXISTING EXHAUST FANS ER-F-1 (DECONTAMINATION ROOM) AND ER-F-2 (ISOLATION ROOMS) SHALL BE CONSTANT VOLUME, SHALL NORMALLY RUN CONTINUOUSLY, AND SHALL HAVE START/STOP CAPABILITY PROVIDED THROUGH THE DDC SYSTEM. EXISTING ADJUSTABLE CURRENT SENSOR SHALL BE USED FOR RUN STATUS INDICATION THROUGH THE PEC.

C. EXISTING ADJUSTABLE CURRENT SENSORS (ACS) SHALL BE USED TO MONITOR FANS' STATUS BY READING THE AMPS DRAWN BY THEIR MOTORS. ACS SHALL BE CAPABLE OF, AND SHALL BE CONFIGURED TO, DISTINGUISH BETWEEN A BROKEN FAN BELT CONDITION AND NORMAL FAN OPERATION. THROUGH THE PEC, THE ACS SHALL INDICATE THE RUN STATUS OF THE FANS.

D. EACH EXHAUST FAN IS EQUIPPED WITH A MOTORIZED ANTI-BACKFLOW DAMPER. THIS DAMPER SHALL OPEN WHEN THE FAN IS TURNED ON AND CLOSE WHEN THE FAN IS OFF. FOR FANS EQUIPPED WITH MOTORIZED DAMPERS, THE DAMPERS' ELECTRIC ACTUATORS ARE POWERED DIRECTLY FROM THE MOTOR POWER SUPPLY, WHICH SHALL OPEN THE DAMPERS WHEN FANS ARE STARTED.

1. EXHAUST FAN ER-F-1 HAS A MOTORIZED ANTI-BACKFLOW DAMPER IN THE DUCT ON THE DISCHARGE SIDE.

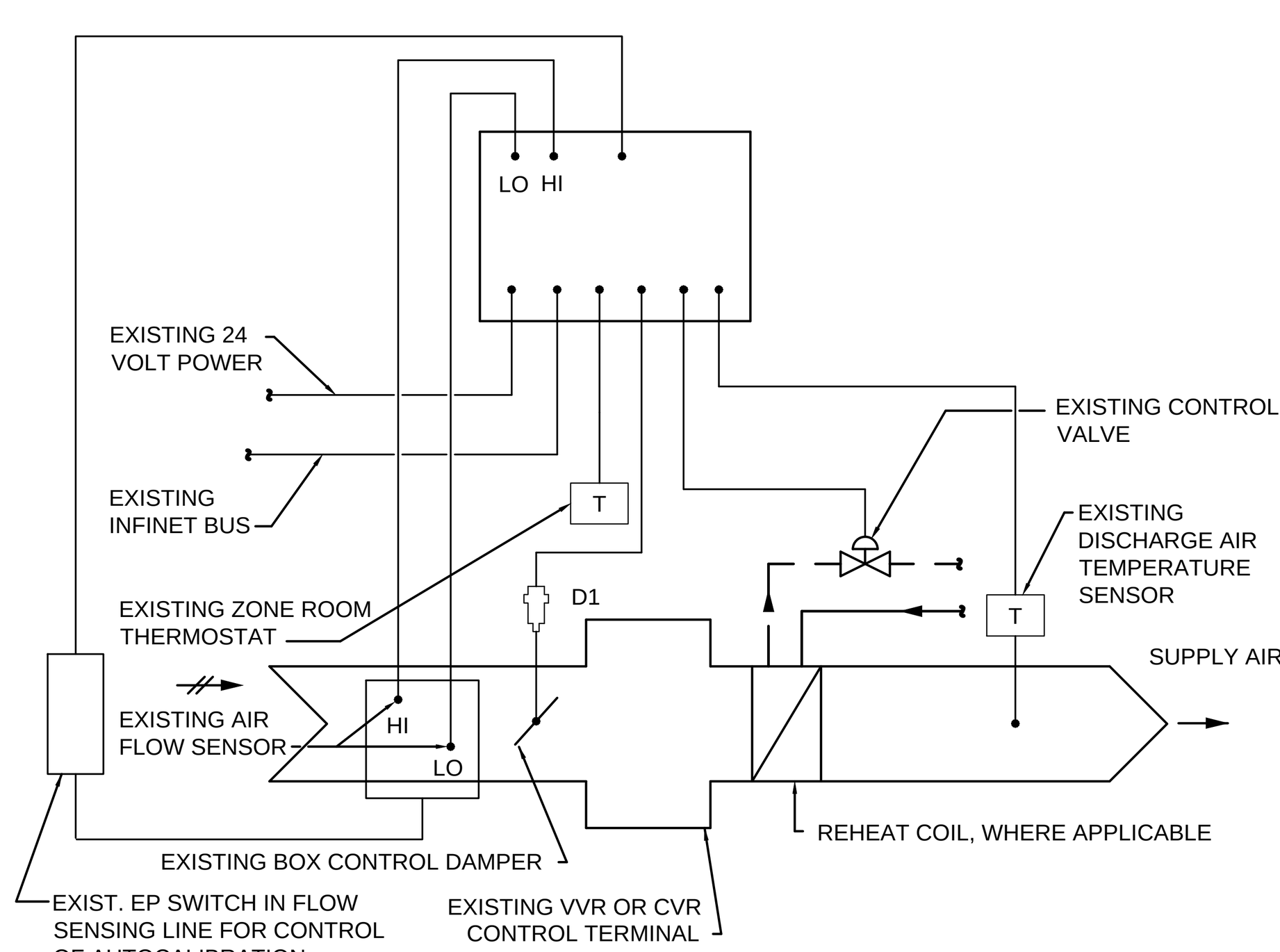
2. EXHAUST FAN ER-F-2 HAS A MOTORIZED ANTI-BACKFLOW DAMPER IN THE DUCT ON THE INLET SIDE.

1.8. ISOLATION ROOM DIFFERENTIAL PRESSURE MONITOR

A. ROOM DIFFERENTIAL PRESSURE MONITORS FOR EACH ISOLATION ROOM ARE EXISTING TO REMAIN.

LEGEND (APPLIES TO AIR HANDLING UNIT ER-AHU-2)

C	CURRENT SENSING RELAY	TRANSMITS MOTOR CURRENT TO DCP TO INDICATE STATUS OF FANS.
DP-1 DP-2	DIFFERENTIAL PRESSURE SENSOR	TRANSMITS DIFFERENTIAL PRESSURE TO DCP TO INDICATE FILTER CONDITION
DCP	DIRECT DIGITAL CONTROL PANEL	CONTROLS OPERATION OF AIR HANDLING UNIT IN ACCORDANCE WITH THE SEQUENCE OF OPERATION
D-1	MODULATING OUTSIDE AIR DAMPER	PROPORTIONS FLOW OF OUTSIDE AIR IN RESPONSE TO DCP AND CLOSES WHEN SUPPLY FAN STOPS
D-2	MODULATING RETURN AIR DAMPER	PROPORTIONS FLOW OF RETURN AIR IN RESPONSE TO DCP AND OPENS WHEN SUPPLY FAN STOPS
D-3	MODULATING RELIEF AIR DAMPER	PROPORTIONS FLOW OF RELIEF AIR IN RESPONSE TO DCP AND CLOSES WHEN SUPPLY FAN STOPS
D-4	MODULATING PREHEAT COIL FACE & BYPASS DAMPER	PROPORTIONS FLOW OF AIR THROUGH PREHEAT COIL IN RESPONSE TO DCP TEMPERATURE CONTROL AND FREEZE PROTECTION
DSD	DUCT SMOKE DETECTORS	PROVIDE SMOKE SIGNAL TO DCP
ECC	ENGINEERING CONTROL CENTER	LOCATED IN B310 4TH FLOOR MEZZANINE FOR MONITORING OF SYSTEM OPERATIONS
H-1	RETURN AIR HUMIDITY SENSOR	SENSES AND TRANSMITS RETURN AIR HUMIDITY TO DCP FOR CONTROL AND INDICATION
H-2	SUPPLY AIR HUMIDITY SENSOR (HIGH LIMIT)	SENSES AND TRANSMITS SUPPLY AIR HUMIDITY TO DCP FOR CONTROL AND INDICATION
OAH	OUTSIDE AIR HUMIDITY SENSOR	SENSES AND TRANSMITS OUTSIDE AIR HUMIDITY TO DCP FOR ENTHALPY CALCULATION.
SPS-1	SUPPLY DUCT STATIC PRESSURE SENSOR	SENSES AND TRANSMITS DUCT STATIC PRESSURE TO DCP FOR CONTROL AND INDICATION
SPS-2	SUPPLY DUCT HIGH LIMIT STATIC PRESSURE SENSOR	SENSES AND TRANSMITS DUCT STATIC PRESSURE NEAR SUPPLY FAN TO DCP
SPS-3	RETURN DUCT HIGH LIMIT STATIC PRESSURE SENSOR	SENSES AND TRANSMITS DUCT STATIC PRESSURE NEAR RETURN FAN TO DCP
T-1	SUPPLY AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS SUPPLY AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-2	OUTSIDE AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS OUTSIDE AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-3	PREHEAT COIL LEAVING AIR LOW LIMIT TEMPERATURE SENSOR (FREEZESTAT)	SENSES AND TRANSMITS PREHEAT AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-4	RETURN AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS RETURN AIR DRY BULB TEMPERATURE TO DCP FOR INDICATION ONLY
T-5	MIXED AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS MIXED AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION
T-6	COOLING COIL LEAVING AIR TEMPERTURE	SENSES AND TRANSMITS COOLING COIL DISCHARGE AIR TEMPERATURE TO DCP FOR INDICATION ONLY
V-1	MODULATING CHILLED WATER CONTROL VALVE	PROPORTIONS FLOW OF CHILLED WATER TO COOLING COIL IN RESPONSE TO DCP
V-2	MODULATING STEAM CONTROL VALVE	PROPORTIONS FLOW OF STEAM TO PREHEAT COIL IN RESPONSE TO DCP
V-3	MODULATING STEAM CONTROL VALVE	PROPORTIONS FLOW OF STEAM TO HUMIDIFIER IN RESPONSE TO DCP
VPS	VELOCITY PRESSURE SENSOR	SENSES AND TRANSMITS VELOCITY PRESSURE TO DCP FOR AIRFLOW MEASUREMENT
VSMC	VARIABLE SPEED MOTOR CONTROLLER WITH MOTOR STARTER	CONTROLS SUPPLY AND RETURN FAN MOTOR SPEEDS IN RESPONSE TO DCP



VVR AND CVR TERMINAL CONTROLS

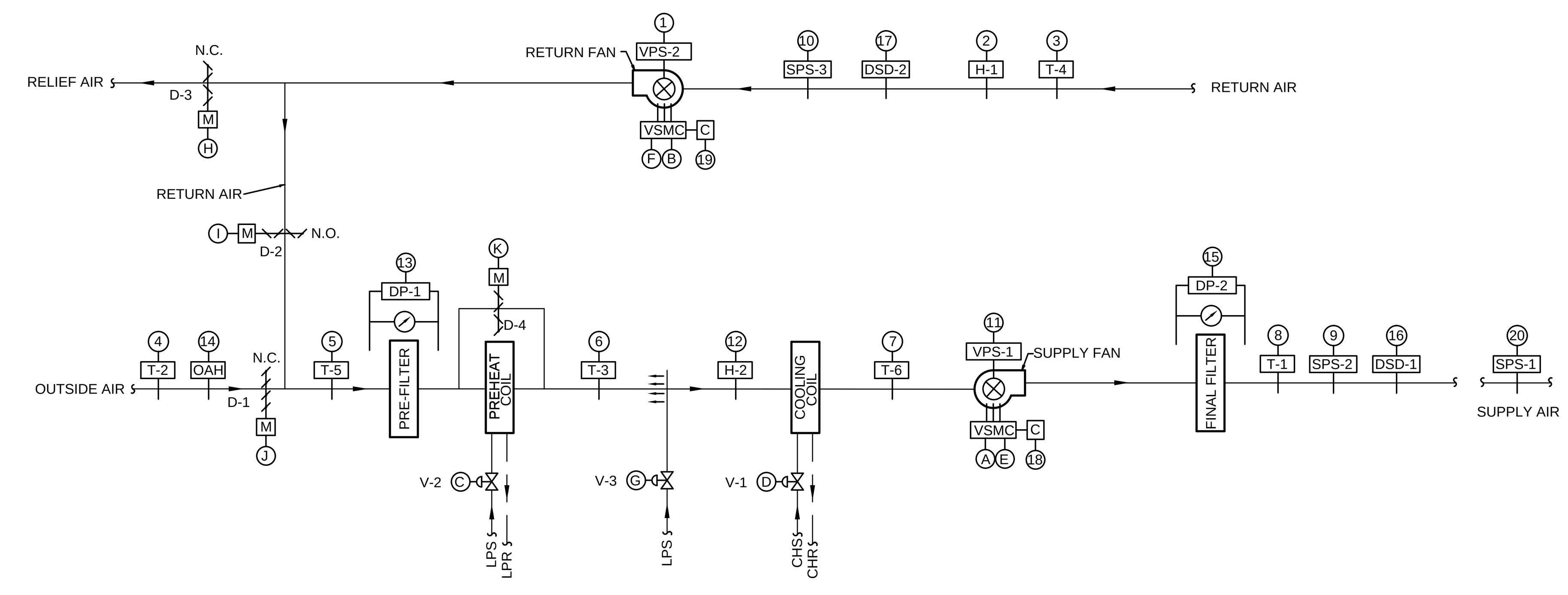
EXISTING VAV AND CAV REHEAT AIR TERMINAL UNITS TO REMAIN (QTY. 21). REFER TO AIR HANDLING UNIT CONTROL SEQUENCE FOR OPERATION.

GENERAL NOTES

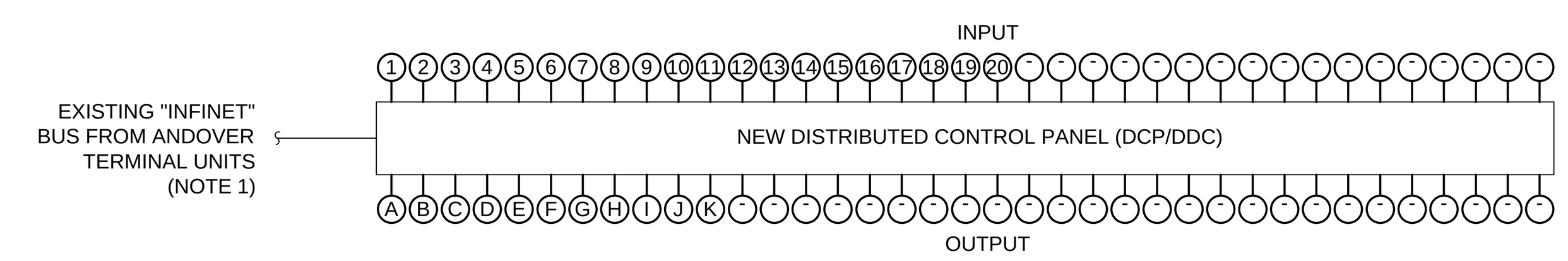
1 A COMPLETE SYSTEM OF AUTOMATIC TEMPERATURE CONTROLS SHALL BE INSTALLED UNDER THIS CONTRACT AS REQUIRED TO ACCOMPLISH THE SEQUENCE OF CONTROL FOR VARIOUS ITEMS OF EQUIPMENT AND SYSTEMS AS DESCRIBED HEREINAFTER. THE SYSTEM SHALL BE A DIRECT DIGITAL CONTROL SYSTEM UTILIZING PNEUMATIC ACTUATION.

2 ALL CONTROL POWER SOURCES REQUIRED SHALL BE PROVIDED UNDER THE ATC WORK. THIS WORK SHALL INCLUDE BUT NOT BE LIMITED TO WIRING, CONDUIT, TRANSFORMERS, RELAYS AND FUSES.

3 POINTS LIST IS SHOWN AS AN AID TO THE CONTRACTOR INDICATING THE MINIMUM POINTS REQUIRED FOR CONTROL AND MONITORING. ALL INPUT AND OUTPUT POINTS, AND THEIR REQUIRED INTERFACE AND ACCESSORY HARDWARE, SHALL BE PROVIDED FOR A COMPLETE AND FUNCTIONAL CONTROL SYSTEM. IF OR WHEN ADDITIONAL POINTS ARE REQUIRED TO ACCOMPLISH THE SEQUENCES OF CONTROL SPECIFIED, THESE POINTS, ALONG WITH ADDITIONAL DIRECT DIGITAL CONTROL PANEL(S) (IF REQUIRED), SHALL ALSO BE PROVIDED.



AIR HANDLING UNIT ER-AHU-2



CONTROL PANEL ER-AHU-2

CONTROL PANEL ER-AHU-2 POINTS LIST

	POINT ID	DEVICE TAG	DEVICE DESCRIPTION	POINT TYPE DI	DO	AI	AO
(NOTE 2)	1	VPS-2	RETURN AIR FLOW MEASURING STATION			X	
(NOTE 2)	2	H-1	RETURN AIR HUMIDITY SENSOR			X	
(NOTE 2)	3	T-4	RETURN AIR TEMPERATURE SENSOR			X	
(NOTE 2)	4	T-2	OUTSIDE AIR TEMPERATURE SENSOR (GLOBAL POINT)			X	
(NOTE 2)	5	T-5	MIXED AIR TEMPERATURE SENSOR			X	
(NOTE 2)	6	T-3	PREHEAT COIL LEAVING AIR LOW LIMIT TEMPERATURE SENSOR (FREEZESTAT)	X			
(NOTE 2)	7	T-6	COOLING COIL LEAVING AIR TEMPERATURE SENSOR			X	
(NOTE 2)	8	T-1	SUPPLY AIR TEMPERATURE SENSOR			X	
(NOTE 2)	9	SPS-2	SUPPLY DUCT HIGH STATIC SAFETY	X			
(NOTE 2)	10	SPS-3	RETURN DUCT HIGH STATIC SAFETY	X			
(NOTE 2)	11	VPS-1	SUPPLY AIR FLOW MEASURING STATION			X	
(NOTE 2)	12	H-2	SUPPLY AIR HUMIDITY SENSOR (HIGH LIMIT)	X			
(NOTE 2)	13	DP-1	PRE FILTER PRESSURE DROP			X	
(NOTE 2)	14	OAH	OUTSIDE AIR HUMIDITY (GLOBAL POINT)			X	
(NOTE 2)	15	DP-2	FINAL FILTER PRESSURE DROP			X	
(NOTE 2)	16	DSD-1	SUPPLY AIR DUCT SMOKE DETECTOR (FIRE SYSTEM SHUTDOWN)	X			
(NOTE 2)	17	DSD-2	RETURN AIR DUCT SMOKE DETECTOR (FIRE SYSTEM SHUTDOWN)	X			
(NOTE 2)	18	C	SUPPLY FAN STATUS CURRENT SWITCH	X			
(NOTE 2)	19	C	RETURN FAN STATUS CURRENT SWITCH	X			
(NOTE 2)	20	SPS-1	SUPPLY AIR STATIC PRESSURE SENSOR			X	
(NOTE 2)	A	VSMC	SUPPLY FAN START-STOP		X		
(NOTE 2)	B	VSMC	RETURN FAN START-STOP		X		
(NOTE 2)	C	V-2	MODULATING PREHEAT COIL VALVE				X
(NOTE 2)	D	V-1	MODULATING COOLING COIL VALVE				X
(NOTE 2)	E	VSMC	SUPPLY FAN VARIABLE SPEED MOTOR CONTROLLER				X
(NOTE 2)	F	VSMC	RETURN FAN VARIABLE SPEED MOTOR CONTROLLER				X
(NOTE 2)	G	V-3	MODULATING STEAM HUMIDIFIER VALVE				X
(NOTE 2)	H	D-3	MODULATING RELIEF AIR DAMPER				X
(NOTE 2)	I	D-2	MODULATING RETURN AIR DAMPER				X
(NOTE 2)	J	D-1	MODULATING OUTSIDE AIR DAMPER				X
(NOTE 2)	K	D-4	MODULATING PREHEAT COIL FACE & BYPASS DAMPER				X

NOTES:

1 DDC ZONE CONTROL IS EXISTING ANDOVER TERMINAL UNIT CONTROLLERS - REFER TO VVR AND CVR CONTROL TERMINAL DIAGRAM ON THIS SHEET. INTEGRATE EXISTING ANDOVER ZONE CONTROLS INTO NEW NIAGARA AX PROGRAMMABLE EQUIPMENT CONTROLLER. PROVIDE EQUIPMENT AND FLOOR PLAN GRAPHICS AT ECC.

2 EXISTING ELECTRONIC SENSOR/RELAY/DEVICE TO REMAIN, SHALL BE RE-USED.

Revisions		Date

STATE OF OHIO — GARY S. EODICE E-52755 — REGISTERED PROFESSIONAL ENGINEER

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PROJECT NO. 2013-04011 FIRM LICENSE NO. 01528

Drawing Title: BUILDING 310 CONTROLS AND AUTOMATION

Approved: Chief, Engineering Service

Project Title: DVAMC IMPROVE BUILDING AUTOMATION SYSTEM

Building Number: 310 | Checked: PCW | Drawn: JAC

Location: Dayton, Ohio

Date: 05/23/2014

Project No.: VA Project No. 552-15-207

Drawing Number: MC310

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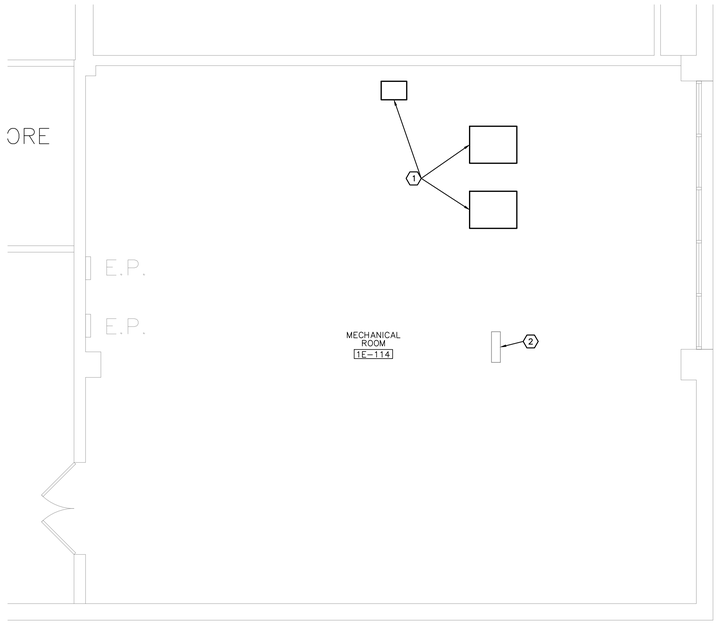
Planning & Design — Department of Veterans Affairs

PROJECT NO. 2013-04011 PLOTTED BY: JACoyle PLOT/EDIT DATE: May 22, 2014
HEAPY ENGINEERING DAYTON/COLUMBUS, OHIO & INDIANAPOLIS, INDIANA MECHANICAL ELECTRICAL COMMISSIONING TECHNOLOGY



MECHANICAL ROOM FLOOR PLAN

GENERAL NOTES

A REFER TO SHEET M001 FOR LEGEND, ABBREVIATIONS, AND ADDITIONAL GENERAL NOTES.

NOTES

1 REMOVE EXISTING PACKAGED SCREW COMPRESSOR UNITS AND ASSOCIATED REFRIGERATED AIR DRYER AND COALESCING FILTER, AND FURNISH AND INSTALL NEW. EACH NEW COMPRESSOR PACKAGE SHALL HAVE THE FOLLOWING MINIMUM PERFORMANCE: 31 CFM, 150 PSIG RATED OPERATING PRESSURE, 7.5 HP, 460V-3PH, SINGLE POINT CONNECTION. REFER TO 23 15 00 FOR ADDITIONAL REQUIREMENTS. RE-USE EXISTING POWER CIRCUIT(S) - DISCONNECT FROM EXISTING EQUIPMENT AND RECONNECT TO NEW.

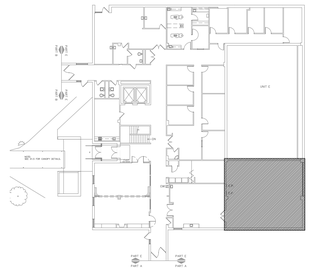
2 EXISTING TRIDIUM NIAGRA AX JACE PANEL TO REMAIN. INTEGRATE CONTROLS FOR NEW COMPRESSORS IN THIS ROOM INTO BAS THROUGH THIS PANEL.

1.1 FOR EACH COMPRESSOR PACKAGE, PROVIDE THE FOLLOWING FOR MONITORING AND LEAD/LAG CONTROL: START/STOP RELAY FOR ENABLE/DISABLE THROUGH BAS; CURRENT SWITCH FOR STATUS INDICATION, AND PRESSURE SENSOR IN MAIN SUPPLY LINE, LOCATED IN DOWNSTREAM PIPING COMMON TO BOTH COMPRESSORS. PRESSURE SENSOR SHALL HAVE DIGITAL DISPLAY FOR LOCAL INDICATION. ALTERNATE COMPRESSORS ON A MONTHLY BASIS.

1.2 PROVIDE ALARMS AT ECC, AS FOLLOWS: IF A COMPRESSOR IS ENABLED AND STATUS IS NOT PROVEN AFTER A 2 MINUTE DELAY, OR IF MAIN SUPPLY LINE PRESSURE REMAINS HIGHER OR LOWER THAN SETPOINT BY MORE THAN 10% FOR 2 CONSECUTIVE MINUTES.

1.3 ALL SETPOINTS AND PARAMETERS SHALL BE ADJUSTABLE THROUGH THE BAS. PROVIDE EQUIPMENT AND FLOOR PLAN GRAPHICS AT THE ECC.

COMPRESSOR CONTROLS



KEYPLAN - 1ST FLOOR

Revisions	Date

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PROJECT NO. 2013-04011 FIRM LICENSE NO. 01528

Drawing Title: BUILDING 320 FLOOR PLANS, CONTROLS AND AUTOMATION

Approved: Chief, Engineering Service

Project Title: DVAMC IMPROVE BUILDING AUTOMATION SYSTEM

Building Number: 320 | Checked: PCW | Drawn: JAC

Location: Dayton, Ohio

Date: 05/23/2014

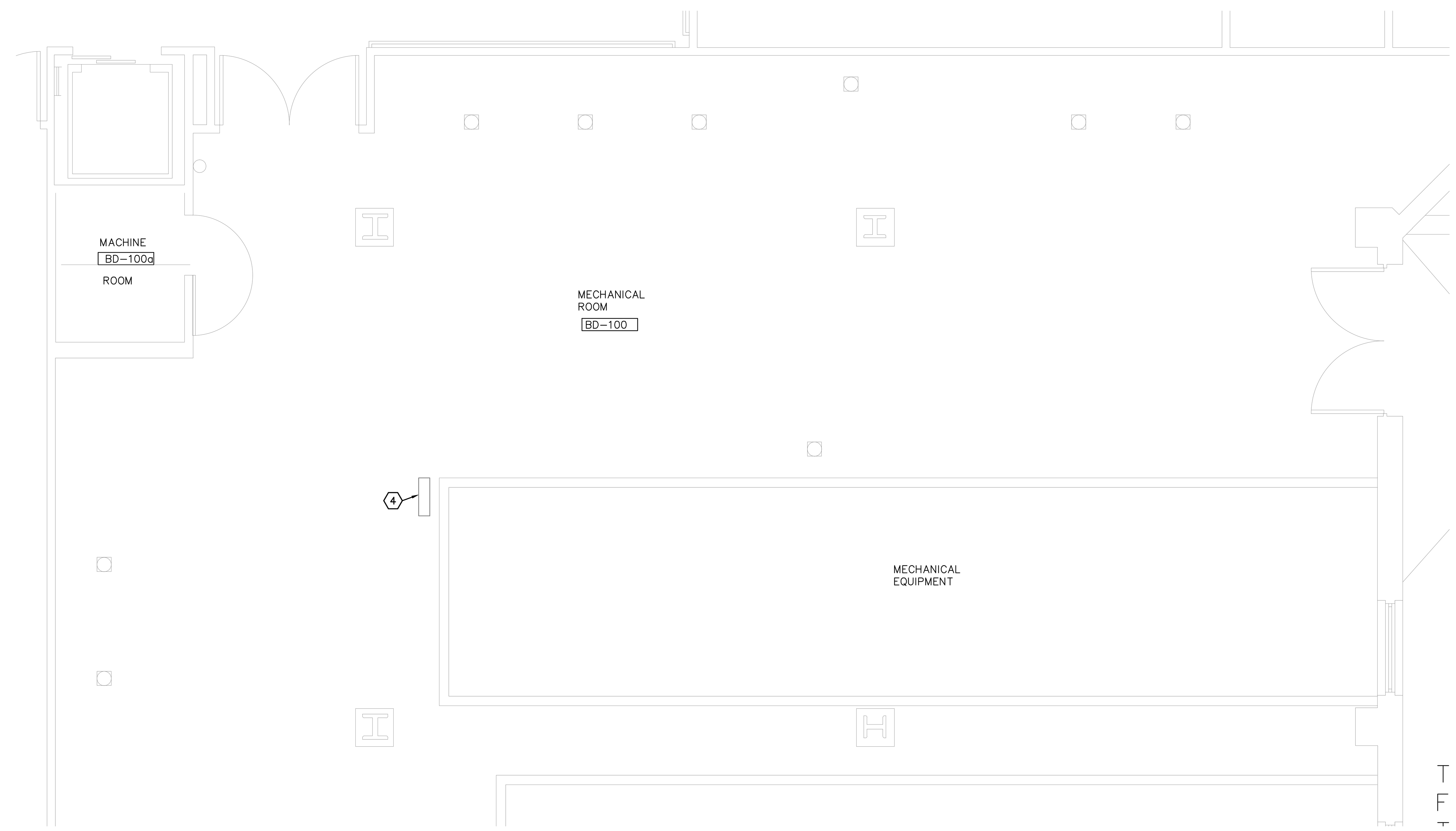
Project No.: VA Project No. 552-15-207

Drawing Number: M320

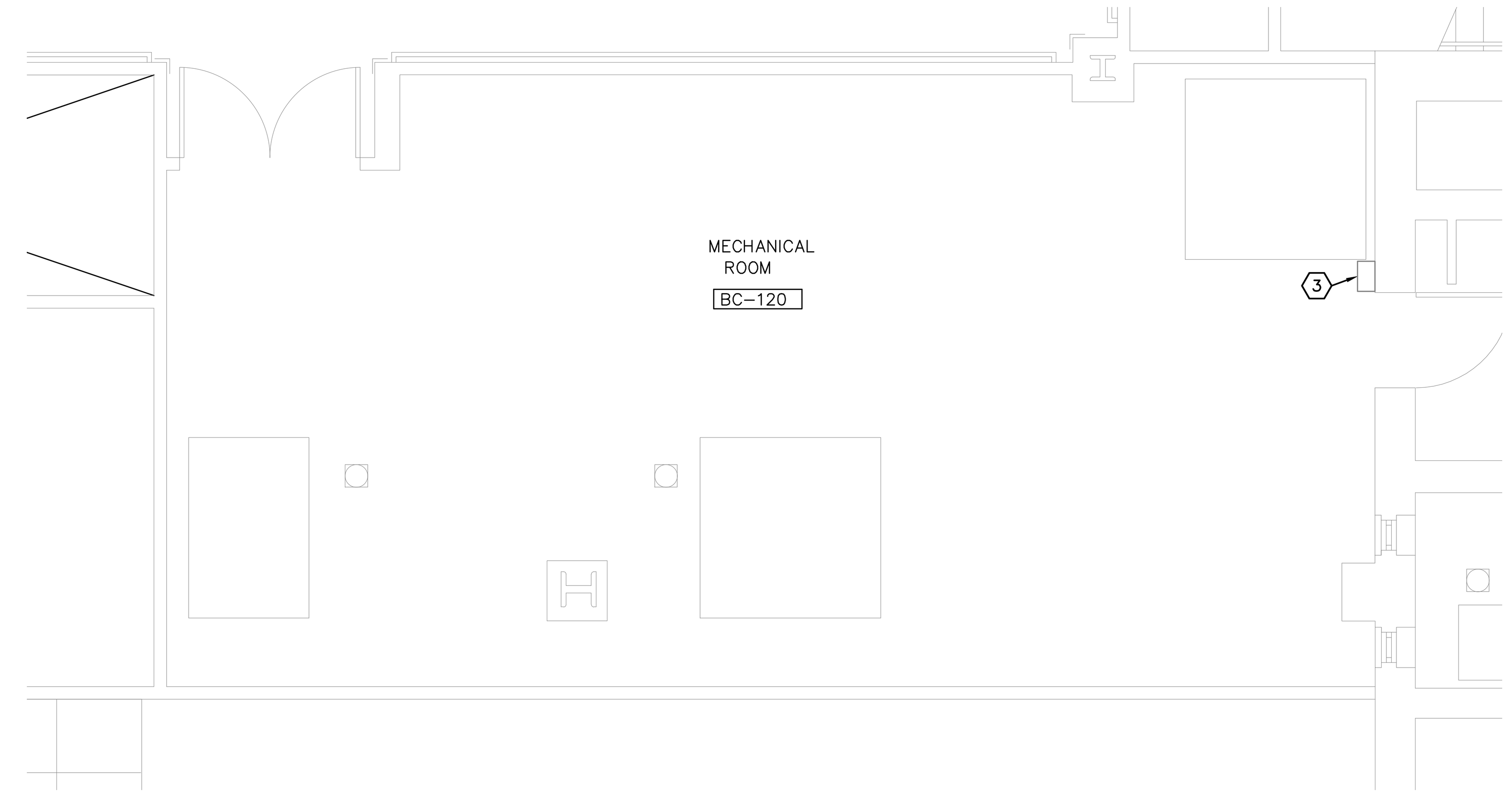
Sheet of

Planning & Design — Department of Veterans Affairs

PROJECT NO. 2013-04011
HEAPY ENGINEERING
DAYTON/COLUMBUS, OHIO & INDIANAPOLIS, INDIANA
MECHANICAL ELECTRICAL COMMISSIONING TECHNOLOGY
PLOTTED BY: JACKyle
PLOT DATE: May 22, 2014



PARTIAL BASEMENT FLOOR PLAN - SOUTHEAST
SCALE: 1/4" = 1'-0"



PARTIAL BASEMENT FLOOR PLAN - NORTHEAST
SCALE: 1/4" = 1'-0"

GENERAL NOTES

A REFER TO SHEET M001 FOR LEGEND, ABBREVIATIONS, AND ADDITIONAL GENERAL NOTES.

NOTES

1 REMOVE EXISTING PACKAGED SCREW COMPRESSOR UNITS AND ASSOCIATED REFRIGERATED AIR DRYERS AND COALESCING FILTER, AND FURNISH & INSTALL NEW. EACH NEW COMPRESSOR PACKAGE SHALL HAVE THE FOLLOWING MINIMUM PERFORMANCE: 51 CFM, 125 PSIG RATED OPERATING PRESSURE, 15 HP, 460V-3PH, SINGLE POINT CONNECTION. REFER TO 23 15 00 FOR ADDITIONAL REQUIREMENTS. RE-USE EXISTING POWER CIRCUIT(S) - DISCONNECT FROM EXISTING EQUIPMENT AND RECONNECT TO NEW.

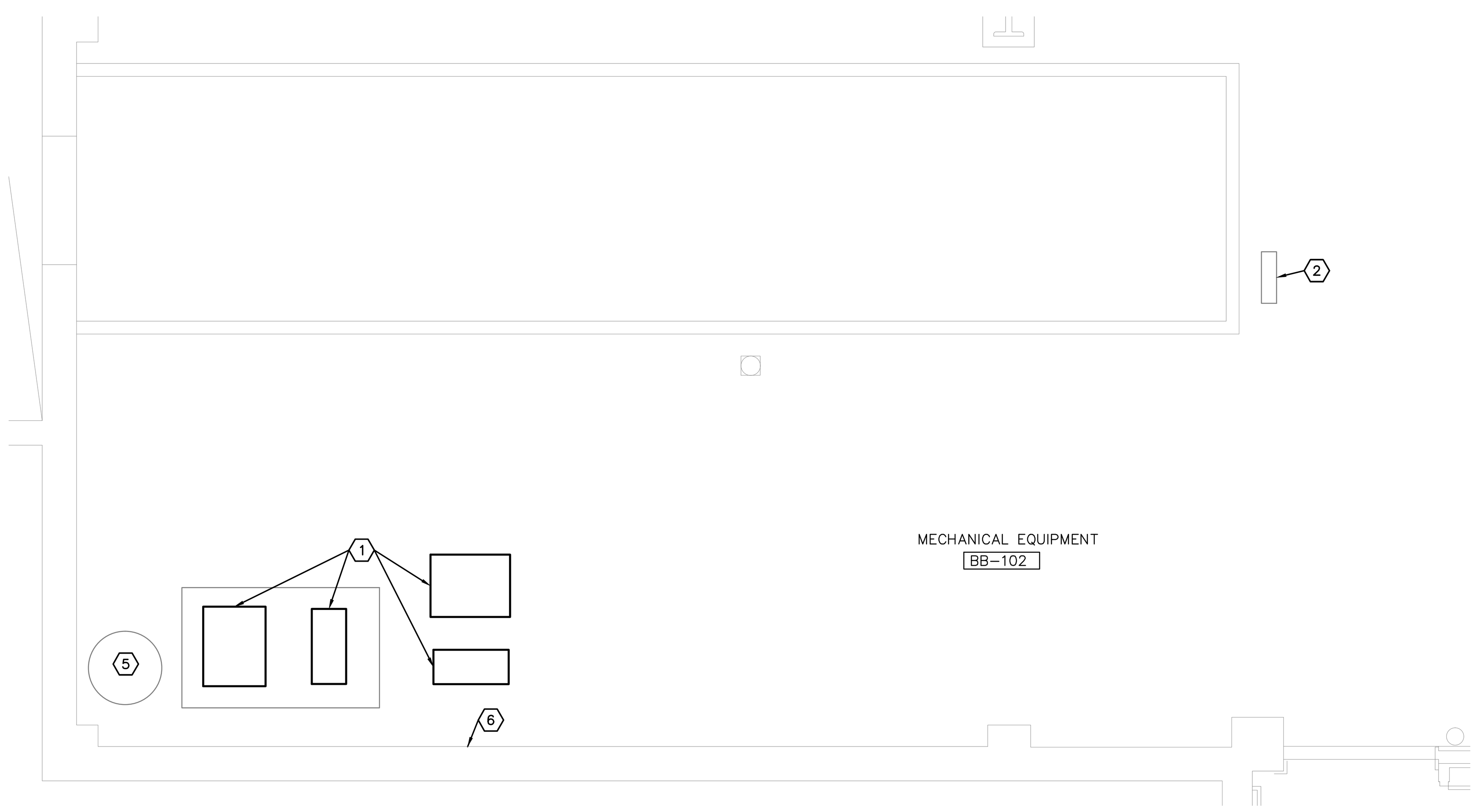
2 EXISTING TRIDIUM NIAGARA AX JACE PANEL ASSOCIATED WITH AHU-5 TO REMAIN. INTEGRATE CONTROLS FOR NEW COMPRESSORS IN THIS ROOM INTO BAS THROUGH THIS PANEL.

3 EXISTING ARMSTRONG STEAMEYE SERIES 4000 M GATEWAY ASSOCIATED WITH WIRELESS STEAM TRAP MONITORING SYSTEM. GATEWAY IS CURRENTLY CONNECTED DIRECTLY TO VA NETWORK SWITCH, WITH SYSTEM INFORMATION VIEWED THROUGH WEB BROWSER. EXISTING NETWORK CONNECTION AND ASSOCIATED WIRING SHALL BE REMOVED. COORDINATE REMOVAL WITH VA IT DEPARTMENT FOR ACCESS TO SIGNAL CLOSET. GATEWAY HAS BUILT-IN MODBUS RS-232 AND RS-485 COMMUNICATION PLATFORM. INTEGRATE GATEWAY INTO ECC THROUGH EXISTING JACE SERVING AHU-6, LOCATED IN ROOM BD-100. INTEGRATE TO ALLOW MONITORING, VIEWING, AND ALARMING OF EXISTING TRAP MONITORING SYSTEM THROUGH EXISTING NIAGARA AX WEB SUPERVISOR AT ECC. PROVIDE GRAPHICS AT ECC OF EACH TRAP MONITOR, AS WELL AS CAMPUS STEAM TUNNEL SITE PLAN GRAPHIC SHOWING LOCATION OF ALL TRAP MONITORING SYSTEM COMPONENTS (TRAP MONITORS, WIRELESS REPEATERS, GATEWAY, ETC.). TUNNEL PLAN GRAPHIC SHALL INDICATE STATUS OF ALL TRAP MONITORS (STATUS OK, LOW BATTERY, TRAP FAILED, ETC.) ON THE SAME SCREEN, USING DIFFERENT COLORS.

4 EXISTING TRIDIUM NIAGARA AX JACE PANEL ASSOCIATED WITH AHU-6 TO REMAIN. INTEGRATE EXISTING ARMSTRONG STEAMEYE TRAP MONITORING SYSTEM INTO BAS THROUGH THIS PANEL. PROVIDE NEW DRIVER IN EXISTING JACE AS REQUIRED FOR THIS INTEGRATION.

5 EXISTING COMPRESSED AIR SYSTEM STORAGE TANK TO REMAIN. TANK DOES NOT CURRENTLY HAVE A SAFETY RELIEF VALVE. PROVIDE SAFETY RELIEF VALVE ON TANK.

6 REMOVE EXISTING PRESSURE REGULATOR AND REPLACE WITH NEW. PRESSURE SETTING OF NEW REGULATOR SHALL MATCH EXISTING SET PRESSURE.



PARTIAL BASEMENT FLOOR PLAN - WEST
SCALE: 1/4" = 1'-0"

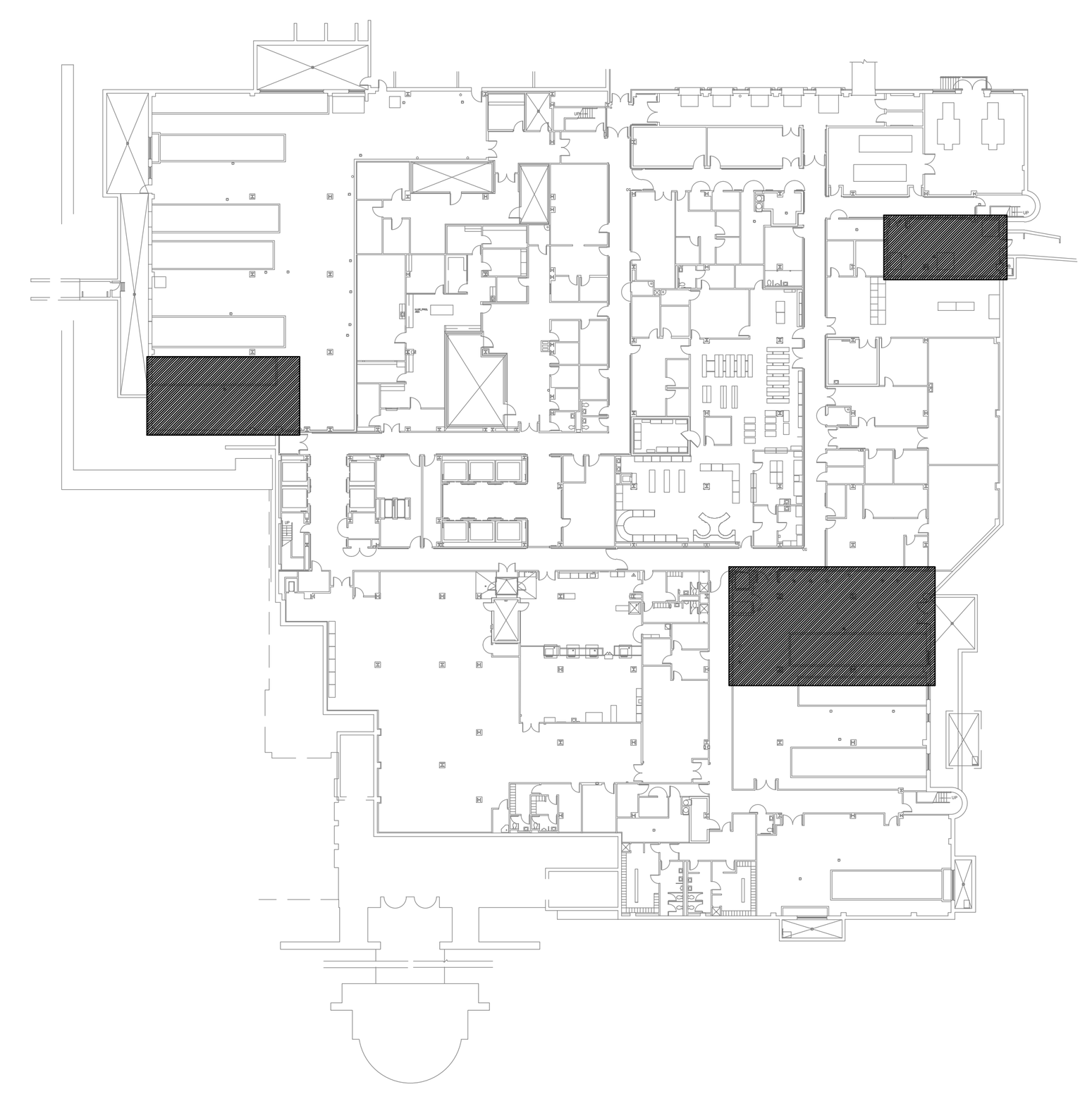
1.1 FOR EACH COMPRESSOR PACKAGE, PROVIDE THE FOLLOWING FOR MONITORING AND LEAD/LAG CONTROL: START/STOP RELAY FOR ENABLE/DISABLE THROUGH BAS, CURRENT SWITCH FOR STATUS INDICATION, AND PRESSURE SENSOR IN MAIN SUPPLY LINE, LOCATED IN DOWNSTREAM PIPING COMMON TO BOTH COMPRESSORS. PRESSURE SENSOR SHALL HAVE DIGITAL DISPLAY FOR LOCAL INDICATION. ALTERNATE COMPRESSORS ON A MONTHLY BASIS.

1.2 FOR EACH REFRIGERATED AIR DRYER PACKAGE, PROVIDE THE FOLLOWING FOR MONITORING AND LEAD/LAG CONTROL: START/STOP RELAY FOR ENABLE/DISABLE THROUGH BAS, AND CURRENT SWITCH FOR STATUS INDICATION. ALTERNATE DRYERS ON A MONTHLY BASIS, ON THE SAME SCHEDULE AS ASSOCIATED COMPRESSORS.

1.3 PROVIDE ALARMS AT ECC, AS FOLLOWS: IF A COMPRESSOR OR REFRIGERATED AIR DRYER IS ENABLED AND STATUS IS NOT PROVEN AFTER A 2 MINUTE DELAY, OR IF MAIN SUPPLY LINE PRESSURE REMAINS HIGHER OR LOWER THAN SETPOINT BY MORE THAN 10% FOR 2 CONSECUTIVE MINUTES.

1.4 ALL SETPOINTS AND PARAMETERS SHALL BE ADJUSTABLE THROUGH THE BAS. PROVIDE EQUIPMENT AND FLOOR PLAN GRAPHICS AT THE ECC.

COMPRESSOR CONTROLS



KEYPLAN - BASEMENT

Revisions		Date

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PROJECT NO. 2013-04011 FIRM LICENSE NO. 01528

Drawing Title: BUILDING 330 FLOOR PLANS, CONTROLS AND AUTOMATION

Approved: Chief, Engineering Service

Project Title: DVAMC IMPROVE BUILDING AUTOMATION SYSTEM

Building Number: 330 | Checked: PCW | Drawn: JAC

Location: Dayton, Ohio

Date: 05/23/2014

Project No.: VA Project No. 552-15-207

Drawing Number: M330

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Department of Veterans Affairs